COUNTY OF ALAMEDA

ADDENDUM No. 5

to

RFQ/P No. 13023

for

Cherryland Community Center
November 28, 2017

Bid Document Amendments

BID DUE DATE: December 7, 2017, 2PM

This County of Alameda, General Services Agency (GSA), RFP/Q Addendum has been electronically issued to potential bidders via e-mail. E-mail addresses used are those in the County's Small Local Emerging Business (SLEB) Vendor Database or from other sources. If you have registered or are certified as a SLEB, please ensure that the complete and accurate e-mail address is noted and kept updated in the SLEB Vendor Database. This RFP/Q Addendum will also be posted on the GSA Contracting Opportunities website located at http://www.acgov.org/gsa/purchasing/bid_content/ContractOpportunities.jsp.

GENERAL ADDENDUM NOTES

This document includes requirements that clarify or supersede portions of the Request for Proposal.
This Addendum is a Contract Document. All bidders shall acknowledge receipt and acceptance of this Addendum by indicating on Document 00 41 13 - Bid Form-Stipulated Sum (Single-Prime Contract).

The following changes, additions, or deletions shall be made to the following documents as indicated and shall be a part thereof as if originally specified and/or shown. All other conditions remain the same.

In some items below a ~~strikethrough~~ font is used to designate wording that currently appears in the contract documents that shall be deleted, and **bold and highlighted** font is used to designate content that shall be added.

PROJECT MANUAL

5.01 DOCUMENT 00 01 09 – SUMMARY BIDDING CALENDAR *(see attached)*

Receipt of Bids and Bid Opening	December ~~8~~ **7**, 2017, 2:00PM	00 11 16 Notice to Bidders

5.02 DOCUMENT 00 11 16 – NOTICE TO BIDDERS, SECTION 2 *(see attached)*

2. Sealed Bids will be received until 2:00 p.m., December ~~1~~**, 7** 2017, at 1401 Lakeside Drive, 9th Floor, Oakland, California, at or after which time the bids will be opened and publicly read aloud. Any claim by a bidder of error in its bid must be made in compliance with section 5100 et seq. of the Public Contract Code. Any bid that is submitted after this time shall be non-responsive and returned to the bidder.

5.03 SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS *(see attached)*

A. Section reissued in its entirety.

5.04 SECTION 08 41 13 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS *(see attached)*

A. Add Paragraph 7 to Article 1.5.B to define acoustic criteria for storefronts.

5.05 SECTION 32 13 45 – PERMEABLE UNIT PAVERS *(see attached)*

A. Add section in its entirety.

DRAWINGS

No drawings issued for this addendum.

ATTACHMENTS LIST

PROJECT MANUAL:
1) DOC 00 01 09
2) DOC 00 11 16
3) SEC 01 91 13
4) SEC 08 41 13
5) SEC 32 13 43

DRAWING SHEETS: NONE

RESPONSES TO WRITTEN QUESTIONS

No responses to written questions.

END OF ADDENDUM NO. 5

DOCUMENT 00 01 09

SUMMARY BIDDING CALENDAR

NOTICE – THIS SUMMARY IS FOR INFORMATIONAL PURPOSES ONLY. The dates and times listed may not be relied upon or enforced. This summary does not form a part of the contract documents and does not establish contractual obligations.

NOTICE – THIS IS A SUMMARY ONLY AND DOES NOT LIST ALL DATES, TIMES OR TIME PERIODS CONTAINED IN THE BIDDING AND CONTRACT DOCUMENTS. All bidders and contractors must refer to the actual documents for all applicable dates, times and time periods.

Event	Date	Reference
Request for Qualifications Available	**September 13, 2017**	Request for Qualifications
Mandatory Pre-Bid Conference #1 (Attendance at only one of the two meetings is required)	**September 27, 2017 10:00AM Location: 1111 Jackson Street, Oakland, CA 94612**	Request for Qualifications
Mandatory Pre-Bid Conference #2 (Attendance at only one of the two meetings is required) & Non-Mandatory Site Visit.	**September 28, 2017 2:00PM Location: 395 Paseo Grande, San Lorenzo, CA**	Request for Qualifications
Addendum #1 Issue Date (Issue List of Attendees at the Mandatory Pre-Bid Conference)	**October 2, 2017**	Request for Qualifications 00 21 13 Instructions to Bidders
Last Day for GSA to receive any Bidder Questions on RFQ	**May 1, 2017, 2:00PM**	Request for Qualifications
Receipt of Qualifications	**October 9, 2017, 2:00PM**	Request for Qualifications
Qualified Contractors List issued	**October 13, 2017**	Request for Qualifications
Request for Proposal and Bid Documents issued	**October 20, 2017**	00 21 13 Instructions to Bidders

Mandatory Bidders Review and Networking Meeting Date	**November 3, 2017 10:00AM Location: 1111 Jackson Street, Room 242, Oakland, CA 94612**	00 21 13 Instructions to Bidders
Final Questions from Bidder Date	**November 16, 2017, 5:00PM**	00 21 13 Instructions to Bidders
Final Addendum Issue Date (Issue Responses to Bidder Questions)	**November 21, 2017**	00 21 13 Instructions to Bidders
Last Day for Receipt of Requests for Substitutions before Receipt of Bids	**November 20, 2017, 2:00PM**	00 21 13 Instructions to Bidders
Receipt of Bids and Bid Opening	**December 7, 2017, 2:00PM** **1401 Lakeside Dr., Bid Delivery: Room 900 Bid Opening: Room 1107** **Oakland, CA 94612**	00 11 16 Notice to Bidders
Last Day for two (2) lowest Bidders to submit outstanding Bid Documents and ECOP Documentation	**December 12, 2017, 5:00PM** (2 business days following the Bid Opening Date)	00 22 19 Supplementary Instructions to Bidders - Construction Outreach Program
Bid Evaluation Period	**December 13, 2017 to January 15, 2018**	00 21 13 Instructions to Bidders
Notice of Intent to Award	**January 16, 2017**	00 51 13 Notice of Intent to Award

Last Day to Submit Bid Protest	**January 22, 2018** (5th Business Day from Date of Notice of Intent to Award)	00 21 13 Instructions to Bidders
Estimated Board Award of Contract	**January 23, 2018**	00 51 00 Notice of Award
Notice of Award	**January 23, 2018**	00 51 00 Notice of Award
Last Day to Sign & Submit Contract	**January 30, 2018** (7 Calendar days after Notice of Award)	00 11 16 Notice to Bidders 00 51 00 Notice of Award
Last Day to Submit Post-Award Documents	**January 30, 2018** (7 Calendar days after Notice of Award)	00 21 13 Instructions to Bidders
Last Day to Submit Escrow Bid Documentation	**January 30, 2018** (7 Calendar days after Notice of Award)	00 56 00 Escrow Bid Documentation
Issue Notice to Proceed	**February 14, 2018**	00 55 00 Notice to Proceed
Contract Duration	**485 Calendar Days** (Commencing Contract Award Date to Construction Completion Date)	00 52 13 Agreement Form – Stipulated Sum (Single Prime Contract)
Last Day to Submit Construction Schedule, etc. per Notice to Proceed	**February 27, 2018** (10th Business Day following Notice to Proceed)	00 55 00 Notice to Proceed
Construction Start Date	**February 28, 2018**	00 55 00 Notice to Proceed
Construction Completion Date	**June 14, 2019**	00 55 00 Notice to Proceed

END OF DOCUMENT

DOCUMENT 00 11 16

NOTICE TO BIDDERS

1. Notice is hereby given that The County of Alameda General Services Agency ("GSA") Purchasing Department ("County" or "Owner") will receive sealed bids for the following project:

   Cherryland Community Center ("Project")

2. Sealed Bids will be received until **2:00 p.m., December 7, 2017**, at 1401 Lakeside Drive, 9th Floor, Oakland, California, at or after which time the bids will be opened and publicly read aloud. Any claim by a bidder of error in its bid must be made in compliance with section 5100 et seq. of the Public Contract Code. Any bid that is submitted after this time shall be non-responsive and returned to the bidder.

   The Project consists of:
   The Community Development Agency, and the General Services Agency ("GSA") have developed a design for a 18,500 square foot Cherryland Community Center for the residents of the greater unincorporated neighborhoods of Cherryland, San Lorenzo and Ashland ("Project").
   The Project is located at 278 Hampton Road (APN 413-35-010), 17482 Boston Road (APN 413-35-14-03) and the Meek Estate Park parking lot (APN 413-35-19-2) in the community of Cherryland in unincorporated Alameda County. The Project will be constructed on two parcels totaling approximately 56,968 square feet or approximately 1.3 acres. The total Project Area includes an existing parking lot and is approximately 2.2 acres and involves the construction of a new 17,500 square feet Cherryland Community Center and improvements to the existing Meek Estate Park parking lot. The facility will be operated and maintained by Hayward Area Recreational Parks District ("HARD"), which will operate the completed facility.

   HARD is also contributing the Boston Road parcel to the Project site and the improvement of their nearby Meek Estate parking lot. The Cherryland Community Center will serve as a gathering place and community focal point for local residents of all ages. The Cherryland Community Center will include a lobby/reception gathering space area, a 5,000 square feet Community Event Room with adjoining courtyard and commercial kitchen, three (3) Multiple Activity Rooms, a Satellite Library, and additional space for pre-K facilities. The Cherryland Community Center will provide space for a number of uses, including wedding receptions, lectures, performances, speaking engagements, yoga, art and exercise classes; reading programs, library and computer/technology access and a diverse array of educational and recreational classes.

   The Project site will accommodate 20 parking places. Currently with 56 places, the existing parking lot at the nearby Meek Estate will, as part of this scope, be improved and expanded to 105 total spaces.

The budgetary estimate for the scope of work is **$15,000,000**.

The time to complete this project is **Four hundred and eighty-five (485)** calendar days.

3. All bids shall be on the Bid Form Document 00 41 13 provided by the County. Each bid must conform to and be responsive to all pertinent Contract Documents, including, but not limited to, the Instructions to Bidders Document 00 21 13 and the Supplementary Instructions to Bidders - Construction Outreach Program Document 00 22 19.

4. Bidders are strongly encouraged to review the Supplementary Instructions to Bidders – Enhanced Construction Outreach Program Document (ECOP) 00 22 19 and to begin their outreach efforts prior to the initial mandatory project job walk. The list of bidders solicited for this project include but are not limited to all those construction contractors listed in the GSA Small, Local & Emerging Program Vendor Query database located at http://www.acgov.org/sleb_query_app/gsa/sleb/query/slebmenu.jsp .

5. To bid on this Project, the Bidder is required to possess one or more of the following State of California Contractor Licenses:

   B - General Building Contractor
   And all other licenses associated with the Scope of Work

   The Bidder's license(s) must remain active and in good standing throughout the term of the Contract.

6. A bid bond by an admitted surety insurer on the form provided by the County, cash, or a cashier's check or a certified check, drawn to the order of the County of Alameda, in the amount of **ten percent (10%) of the total bid price**, shall accompany the Bid Form, as a guarantee that the Bidder will, **within seven (7) calendar days after the date of the Notice of Award**, enter into a contract with the County for the performance of the services as stipulated in the bid.

7. The successful Bidder shall be required to furnish a **100 % Performance Bond and a 100% Payment Bond** if it is awarded the contract for the Work.

8. The successful Bidder may substitute securities for any monies withheld by the County to ensure performance under the Contract, in accordance with the provisions of section 22300 of the Public Contract Code.

9. The Contractor and all Subcontractors under the Contractor shall pay all workers on all work performed pursuant to this Contract **not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work** as determined by the Director of the Department of Industrial Relations, State of California, for the type of work performed and the locality in which the work is to be performed

within the boundaries of the County, pursuant to sections 1770 et seq. of the California Labor Code. Prevailing wage rates are also available from the County or on the Internet at: <http://www.dir.ca.gov>.

10. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. The following requirements apply to this bid and contract:

    A. No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

    B. No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

11. The Work performed pursuant to this Contract will be subject to the requirements of the "PROJECT STABILIZATION/COMMUNITY BENEFITS AGREEMENT for the COUNTY OF ALAMEDA" as described in Project Stabilization/ Community Benefit Document 00 73 49. In consideration of the award of a Contract to perform the Work, the Contractor agrees to be party to and bound by the "PROJECT STABILIZATION/COMMUNITY BENEFITS AGREEMENT for the COUNTY OF ALAMEDA". Contractor agrees to execute the "PROJECT STABILIZATION/COMMUNITY BENEFITS AGREEMENT for the COUNTY OF ALAMEDA" Letter of Assent and shall require all of its subcontractors, of whatever tier, to become similarly bound for all work within the scope of this Contract by signing an identical Letter of Assent.

12. A mandatory pre-bid conference will be held on **November 3, 2017, 10:00 am at 1111 Jackson St., Room 242, Oakland, CA**. There is a non-mandatory networking conference held on **November 3, 2017 at 11:00 am at 1111 Jackson St., Room 242, Oakland, CA.** This conference is held to help support the efforts of general contractors to find local M/WBE subcontractors to meet their ECOP compliance goals.

13. Contract Documents are available on **October 20, 2017**, via:

    A. Download:
    email request to project manager at brian.laczko@acgov.org for link

    B. Hard copies: Contract Documents are also available for purchase at East Bay Blue Print (see Attachment 1 of this document section). This fee is non-refundable.

14. The County has found and determined that the following item(s) shall be used on this Project based on the purpose(s) indicated. (Public Contract Code section 3400(b)): A

particular material, product, thing, or service is designated by specific brand or trade name for the following purpose(s):

(1) In order to match other products in use on a particular public improvement either completed or in the course of completion.

i. NONE

15. It is County policy to minimize the expenditure of County funds on goods and services produced by any entity which buys, sell, leases or distributes commodities and/or professional services to (1) the government of Burma; or (2) any entity organized under the laws of Burma; or (3) any entity which does business with any private or public entity located in Burma, or conducts operations in Burma. Contractors are urged to comply with the policy in making purchases and subcontracts. (ref. Alameda County, Cal., Adm. Code tit.4, §4.32.050(B),(F))

16. Contractors must comply with County Administrative Code's CONSTRUCTION DEBRIS MANAGEMENT PRACTICES.

17. The County reserves the right to reject any and all bids and/or waive any irregularity in any bid received. If the County awards the Contract, the security of unsuccessful bidder(s) shall be returned **within sixty (60) days from the time the award** is made. Unless otherwise required by law, no bidder may withdraw its bid for **ninety (90) days after the date of the bid opening.**

18. The County shall award the Contract, if it awards it at all, to the lowest responsive responsible bidder based on:

A. [Addendum 4] The awarded low bid must be less than or equal to a lump sum fifteen million dollars ($15,000,000) This will be comprised of the base bid minus the deductive alternates 1-7, deducted in that order to a total sum less than or equal to a lump sum of fifteen million dollars ($15,000,000). If the base project with all seven (7) alternates can be delivered for fifteen million dollars ($15,000,000) or less, then all of the alternates 1-7 will be inclusive in that total final lump sum.

Determination of the responsible bidder with the lowest responsive bid will also be subject to the terms of the Enhanced Construction Outreach Program Document 00 22 19.

END OF DOCUMENT

PLAN ROOM ADVERTISING LIST

☒	1	Bay Area Builders Exchange** 3055 Alvarado Street San Leandro, CA 94577 Phone: (510) 483-8880 ;Fax: (925) 685-3424 Email: planroom@bayareabx.com (This is a merger of Builders Exchange of Alameda County and Contra Costa Builders Exchange 5/18/15.)	☒	2	San Francisco Builders Exchange 850 South Van Ness Avenue San Francisco, CA 94110 Phone: (415) 282-8220 Fax: (415) 821-0363 Email: djohnsonsf@sbcglobal.net
☐	3	Dodge Data and Analytics (Dodge Plan Room, formerly McGraw-Hill Construction Dodge) (Online) 3315 Central Avenue Hot Springs Arkansas (AR) 71913 **(Contact: Gerry McCarthy)** 626-531-6818; Fax: 626-226-1623 Email gerry.mccarthy@construction.com	☒	4	Small Business Exchange 703 Market Street, Suite 1000 San Francisco, CA 94103 Phone: (415) 778-6250 Fax: (415) 778-6255 Email: sbe@sbeinc.com
☒	5	Central California Builders Exchange 1244 N. Mariposa St. Fresno, Ca 93703 Phone (559) 237-1831; Fax (559) 264-2532 Email: megan@cencalbx.com	☒	6	County of Alameda Current Contracting Opportunities Website located at http://www.acgov.org/gsa_app/gsa/purchasing/bid_content/contractopportunities.jsp
☐	7	The Blue Book Building & Construction Network (www.bb-bid.com Online) Contact: Amanda Limitone, Project Communication Specialist Phone: (855) 805-2560, ext.3145; Email: alimitone@thebluebook.com			
☐	8	Reed Construction Data** – Online/Electronic Plan Room 30 Technology Parkway South, Suite 100 Norcross, GA 30092-2912 Phone: (770) 209-3396 Jeannie Kwan; Fax (Addenda only): (800) 303-8629; Fax (Notice to Bidders/IFB): (800) 642-2437; Email (addenda only): docprocessing@reedbusiness.com *-Send requests to advertise to above address/fax/phone-* Local Email: jeannie.kwan@reedbusiness.com (EPR: http://www.reedconstructiondata.com)			
☒	9	East Bay Blue Print & Supply Co. 1745 Fourteenth Ave Oakland, CA 94606 Phone: (510) 261-2990 - Sandy Petty Email: ebbp@eastbayblueprint.com			
☒	10	Construction Bidboard, Inc.(Online)** 11622 El Camino Real, Suite 100 San Diego, CA 92130 800-479-5314 phone; 619-688-0585 fax **(Contact Dorothy Ellithorpe** dellithorpe@ebidboard.com) Alternate: planroom@ebidboard.com* ebidboard@gmail.com			

* Plans/Specs must be sent to individual Plan Rooms to ensure posting at that location.

**Construction trade journals specified for alternate bidding procedures for projects between $25,000 and $125,000 minimum advertising requirements. County policy is to post all construction projects over $25,000 in all listed Plan Rooms, Press/Newspaper Publications and Local Chambers of Commerce/Trade Organizations

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SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general commissioning processes and requirements that apply to the implementation of commissioning. Commissioning is a process of review and verification of specific building systems consisting of design and submittal reviews, contractor completed installation checklists, verification of Test and Balance values, and contractor performed functional testing which are all reviewed or witnessed by the CxA.

B. Related Sections include the following:

1. Section 01 35 13.10 Sustainable Design Requirements
2. Section 01 35 13.20 LEED Requirements
3. Section 22 00 00 Plumbing Systems
4. Section 23 00 00 Heating Ventilating and Air Conditioning Systems
5. Section 23 05 00 Acceptance Requirements
6. Section 26 50 00 Lighting
7. Section 32 84 00 Irrigation System

1.3 DEFINITIONS

A. Basis of Design (BoD) document: A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Building Enclosure: All parts for the exterior shell of a building that provide insulation and air and water resistance such as roofing, windows, flashing, exterior wall cladding, ground contact water proofing , etc.

C. Commissioning: - A process to verify that the identified project systems perform as defined in the approved project documents.

D. CxA: Commissioning Authority.

E. Owner's Project Requirements (OPR): A collection of documents that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.

F. Owner: Alameda County

G. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.

H. TAB: Testing, Adjusting, and Balancing.

1.4 COMMISSIONING TEAM

A. A project team created to coordinate the commissioning effort that coordinates and communicates with the rest of the project team, attend meetings, and solve problems. This team includes representatives from the contractor, subcontractors and owner.

B. The prime contractor shall in addition to their representative also appoint a representative from each subcontractor involved in commissioned systems including mechanical, electrical, controls, Test and Balance, plumbing, building enclosure, and low voltage systems.

C. The owner shall appoint the CxA, facility operations and maintenance, and architect and design members to the commissioning team

1.5 OWNER'S RESPONSIBILITIES

A. Participate in resolution of issues that may occur as a result of the commissioning process.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:

1. Coordination meetings.

2. Training in operation and maintenance of systems, subsystems, and equipment.

3. Testing meetings.

4. Demonstration of operation of systems, subsystems, and equipment.

1.6 CONTRACTOR'S AND SUBCONTACTOR'S RESPONSIBILITIES

A. Provide utility services required for the commissioning process.

B. Contractor is responsible for construction means, methods, job safety, or management function related to commissioning on the job site.

C. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:

1. Participate in construction-phase commissioning meetings including controls coordination meeting to review and resolve any issues with the sequence of operations.

2. Participate in maintenance orientation and inspection.

3. Participate in operation and maintenance training sessions.

4. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.

5. Perform quality control of all work and certify it is complete prior to request for inspection.

6. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

D. Contractor shall integrate all commissioning activities into Contractor's master construction schedule.

E. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:

1. Participate in construction-phase coordination meetings.

2. Participate in maintenance orientation and inspection.

3. Complete pre-functional checklists for all equipment. Submit completed forms with start-up reports immediately after start up.

4. Schedule and perform duct air leakage testing as specified in the technical specification sections with CxA as witness.

5. Provide flushing plans, disinfection reports and water treatment reports to the CxA for review.

6. Participate in pre-TAB meeting and jobsite inspections to verify TAB readiness.

7. Provide draft completed TAB report to CxA for review. CxA will identify up to 25% of TAB report for TAB contractor to demonstrate compliance to the completed TAB report.

8. Participate in procedures meeting for testing.

9. Perform point-to-point, calibration and checkout of the building automation system and provide completed report to the CxA for review.

10. Participate in final review at acceptance meeting.

11. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.

12. Provide information to the CxA for developing construction-phase commissioning plan.

13. Participate in training sessions for operation and maintenance personnel.

14. Verify that all systems function correctly by testing each mode of operation, alarm and system function.

15. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified.

16. Perform quality control of all work and certify it is complete prior to request for inspection.

17. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

18. Perform seasonal testing, at the direction of the CxA, to prove functional performance of the HVAC and controls in the opposite season.

1.7 ARCHITECT AND DESIGN ENGINEER RESPONSIBILITIES

A. Responsible for developing the construction contract documents and clarifying the design intent during the construction phase of the project.

B. Performs construction observation.

1.8 CXA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Prepare a Commissioning Plan. Collaborate with design team, owner, contractor and subcontractors to develop test and inspection procedures. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.

C. Work with the Contractor to schedule commissioning activities. The Contractor shall integrate all commissioning activities into the master construction schedule. All parties will address scheduling issues in a timely manner in order to expedite the commissioning process.

D. Review and comment on submittals for compliance with the approved project documents and identify any potential conflicts.

E. Conduct commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five (5) workdays of the commissioning meeting.

F. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for permanent power; operation and maintenance data submittals; operation and maintenance training sessions; TAB Work; and Project completion.

G. Periodically observe and inspect construction and report progress and deficiencies. In addition to compliance with the Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.

H. Prepare Project-specific pre-functional checklists and functional test procedures checklists.

I. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.

J. Review and comment on operation and maintenance documentation for compliance with the Contract Documents. Operation and maintenance documentation requirements are specified in Division 01 Section "Operation and Maintenance Instructions."

K. Prepare commissioning status reports.

L. Assemble the final commissioning documentation, including the Commissioning Report including applicable Project Record Documents.

1.9 COMMISSIONING DOCUMENTATION

A. Commissioning Plan: A document, prepared by CxA, that outlines the process, schedule, allocation of resources, and documentation requirements of the commissioning effort, and shall include, but is not limited to the following:

1. Description of the organization, layout, and content of commissioning documentation to be provided along with identification of responsible parties.

2. Identification of systems and equipment to be commissioned.

3. Description of the level of commissioning for each system

4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.

5. Identification of items that must be completed before the next operation can proceed.

6. Description of responsibilities of commissioning team members.

7. Description of observations to be made.

8. Description of requirements for operation and maintenance training, including required training materials.

9. Provide a schedule for commissioning activities with specific dates coordinated with overall construction schedule.

10. Define the process for completing pre functional and startup checklists for systems, subsystems, and list of specific equipment requiring these checklists.

11. Include Step-by-step procedures for Functional testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.

B. Pre-Functional Checklists: CxA shall develop pre-functional checklists for all equipment to be commissioned.

C. Functional Performance Testing: CxA shall develop functional performance test procedures for all equipment and systems to be commissioned. Site Visit Reports: CxA shall record test data, observations, and measurements on site visit forms. Photographs and other means appropriate for the application shall be included with data.

D. Test and Inspection Reports: CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.

E. Commissioning Schedule: CxA shall review and provide input to the master project and construction schedules for commissioning activities.

F. Issues Log: CxA shall prepare and maintain an issues log that describes installation, and performance issues that are at variance with the Contract Documents. CxA will identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.

1. Creating an Issues Log Entry:

a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.

b. Assign a descriptive title of the issue.

c. Identify issue date.

d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.

e. Identify system, subsystem, and equipment to which the issue applies.

f. Identify location of system, subsystem, and equipment.

g. Include information that may be helpful in diagnosing or evaluating the issue.

h. Note recommended corrective action.

i. Identify commissioning team member responsible for corrective action.

j. Identify expected date of correction.

k. Identify person documenting the issue.

2. Documenting Issue Resolution:

a. Log date correction is completed or the issue is resolved.

b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.

c. Identify changes to the Contract Documents that may require action, if any.

d. State that correction was completed and system, subsystem, and equipment are ready for retest, if applicable.

e. Identify person(s) who corrected or resolved the issue.

f. Identify person(s) documenting the issue resolution.

G. Commissioning Report: CxA shall document results of the commissioning process including performance of systems, subsystems, equipment and issues. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD and Contract Documents. The commissioning report shall include, but is not limited to, the following:

1. Discussion of performance of commissioned systems including any variance from OPR, BOD and the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during OWNER occupancy and operation. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.

2. Commissioning Plan.

3. Testing plans and reports.

4. Issues log.

5. Completed test checklists.

6. Listing of off-season test(s) not performed and a schedule for their completion.

H. Systems Manual: CxA shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:

1. As-built system narratives, schematics, and list of installed equipment

2. Operation and maintenance data

1.10 CXA SUBMITTALS

A. Commissioning Plan: CxA shall submit a draft commissioning plan. Deliver one copy to the Architect, Engineer, Contractor and Owner. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the CxA for preparation of the final commissioning plan.

B. Pre functional Checklists: CxA shall submit sample checklists and forms to Contractor and subcontractors for review and comment.

C. Functional Test Plan: CxA shall submit draft Functional Test Plan and checklists for comment. The final Functional Test Plan will be submitted and used for functional testing.

D. Site visit reports: CxA shall submit site visit reports as they are created.

E. Final Commissioning Report: CxA shall submit the draft commissioning report. One copy, with review comments, will be returned to the CxA for preparation of final submittal. The final report submittal must address previous review comments.

1.11 COORDINATION

A. Coordinating Meetings: CxA shall conduct coordination meetings of the commissioning team as needed to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.

B. Pretesting Meetings: CxA shall conduct pretest meetings with the commissioning team to review startup reports, coordinate controls sequence of operations, review pretest inspection results, review testing and balancing procedures, review testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

C. Testing Coordination: CxA shall coordinate with the OWNER and Contractor to plan the sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PRE-FUNCTIONAL CHECKLISTS AND FACTORY START UP REPORTS

A. The following procedures apply to all equipment to be commissioned.

B. Pre-functional Checklists are developed by the CxA and completed by the appropriate installing contractors for all major equipment and systems being commissioned before functional testing can begin. The checklist captures equipment nameplate and characteristics data, confirming the as-built status of the equipment or system. These checklists also ensure that the systems are complete and operational, so that the functional performance testing can be scheduled. The Contractor and vendors shall execute factory startup and provide the CxA with a copy of the signed and dated completed start-up checklists which will be submitted with the Pre-Functional checklists.

C. Execution of Pre-functional Checklists and Startup.

1. Pre Functional checklists will be provided to the project site by the CxA.

2. The contractor shall maintain a master copy of signed checklists.

3. The installing contractors shall update the checklists as work is completed. Only individuals that have direct knowledge and witnessed that a line item task on the pre-functional checklist was actually performed shall initial or check that item off.

4. The CxA will periodically review the checklists for completeness and report on progress at the Cx meetings.

D. Deficiencies, Non-Conformance and Approval in Checklists and Startup.

1. The Contractor shall clearly list any outstanding items of the initial start-up and pre-functional procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CxA within two days of test completion.

2. The CxA reviews the report and reports to the OWNER. The CxA shall work with the Contractor and vendors to correct and retest deficiencies or uncompleted items.

3.2 FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope. The objective of functional performance testing is to demonstrate that each system is operating according to the Contract Documents. Each system will be tested to verify that the system response is as designed. HVAC systems will be checked for conformance to the design sequences of operation and stable control, lighting control will be checked in each type of lighting area.. Proper system responses to such conditions as power failure, out of limit condition, equipment failure, etc. shall also be tested.

B. Early duct air leakage tests shall be performed to ensure green and building code compliance. Point-to-point testing will be performed by controls contractor on all applicable systems, with results given to CxA prior to functional performance testing.

C. Development of Test Procedures: The test procedures are written by the CxA based upon the final operational sequences from available project documentation. The CxA shall develop specific test procedures and forms to verify and document proper operation of each system. Prior to execution, the CxA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment and warranty protection. The test procedure checklists developed by the CxA shall include the following information:

1. System and equipment or component name(s).

2. Equipment location and ID number.

3. Date.

4. Project name.

5. Participating parties.

6. Reference to the specification section describing the test requirements, if applicable.

7. A copy of the specific sequence of operations.

8. Prerequisites for the test.

9. Special cautions, alarm limits, etc.

10. Specific step-by-step procedures to execute the test.

11. Acceptance criteria of proper performance with a Yes/No/NA check box.

12. A section for comments.

D. Test Methods.

1. Functional testing is performed by the contractors with the method and degree of testing as defined in this specification for each system. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems to their pre-test condition.

2. Multiple identical pieces of equipment may be functionally tested using a sampling strategy. The sampling strategy will be defined in these specifications with the commissioned systems list.

E. Coordination and Scheduling: The Contractor shall provide sufficient notice to the CxA regarding their completion schedule for the pre-functional checklists and startup of all equipment and systems. The CxA will schedule functional tests through the Owners Representative and Contractor. Problem Solving: The CxA will recommend solutions to problems found; however the burden of responsibility to solve, correct and retest problems is with the Contractor and Owner's consultants.

3.3 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. Before the operation and maintenance training, CxA shall review training preparation for compliance with project documents.

B. Training is required per contract specifications. At a minimum, training is required for Mechanical systems, Lighting, and Controls systems.

C. The CxA requires submission of training records including attendance lists to verify appropriate people received the training.

3.4 COSTS OF COMMISSIONING WORK

A. The cost to the Contractor and Subcontractors to comply with the specified requirements and to support the work of the CxA shall be included in the Contractor's and Subcontractor's bid price.

B. If a device, piece of equipment, sequence, or system fails a test, corrections shall be made and a second test shall be performed. If the second test is not successful, then the CxA's cost for a third test or subsequent tests shall be reimbursed to the CxA by the Contractor.

3.5 COMMISSIONED SYSTEMS

System	Equipment	Level
HVAC, Exhaust and Controls	Variable Refrigerant Flow Units	5
	Variable Refrigerant Branch Controllers	5
	Variable Refrigerant Flow Fan Coils	5
	Split system air conditioners	5
	Circulation Fans	5
	Exhaust fans	5
	Kitchen exhaust system	5
	Test and balance report values	3
Electrical Systems	Scheduled lighting controls	3
	Day-light savings and dimming controls	3
	Lighting occupancy sensors	3
Plumbing Systems	Domestic water heaters	5
	Instant Water Heaters	5
	Drinking Fountain	5

System	Equipment	Level
Landscape/Irrigation	Irrigation Controllers	2
	Manual Sliding Gate	5
	Pedestrian Gate	5

Levels Defined:

Level 1 - The CxA will periodically observe and inspect the installation of equipment and systems and review project documentation (test reports) to verify operational requirements meet the contract documents.

Level 2 - The CxA will periodically observe and inspect the installation of equipment and systems and review project documentation (test reports). The CxA may spot check some of the system functions verify operational requirements are met.

Level 3 - The CxA will periodically observe and inspect the installation of equipment and systems and review project documentation (test reports) and will witness contractor performance testing of the system. Contractor shall test up to 20% of the system to prove operational requirements are met. The test sections shall be chosen at random by the CxA. Failure of any test section shall require retesting of that section and an additional test section equivalent in scope.

Level 4 - The CxA will periodically observe and inspect the installation of equipment and systems and review project documentation (test reports) and will witness contractor performance testing of the system. Contractor shall test up to 50% of the system to prove operational requirements are met. The test sections shall be chosen at random by the CxA. Failure of any test section shall require retesting of that section and an additional test section equivalent in scope.

Level 5 - The CxA will periodically observe and inspect the installation of equipment and systems and review project documentation (test reports) and will witness contractor performance testing of the system. Contractor shall test 100% of the system to prove operational requirements are met. The test sections shall be chosen at random by the CxA. Failure of any test section shall require retesting of that section and an additional test section equivalent in scope.

3.6 METHODS OF TESTING

A. HVAC, Exhaust and Controls

1. Contractor will demonstrate to the CxA that the operation of each system through all modes, alarms, and operating parameters meet the project specifications.

2. The TAB contactor will re-measure up to 25% the final TAB Report for the CxA to observe. The points to be verified will be selected by the CxA.

B. Electrical Systems

1. Upon completion of the lighting control installation and contractor testing the CxA will verify the performance of the system by witnessing its operation.

C. Plumbing

1. Domestic hot water will be tested by the CxA by measuring the hot water temperature at a percentage of the fixtures along with the time it takes to reach that temperature.

D. Irrigation

1. The CxA will witness the contractor demonstration of the irrigation controller.

END OF SECTION 01 91 13

SECTION 08 41 13 – ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Exterior storefront framing system for the following:
   1. Storefront framing for window walls.
   2. Storefront framing for punched openings.

B. Interior storefront.

C. Outrigger, fixed, extruded aluminum sunshades integrated with storefront system.

D. Exterior manual-swing entrance doors.

E. Interior manual-swing entrance doors.

F. Miscellaneous brake shapes and extrusions.

G. Opaque panels for installation in storefront system.

1.3 RELATED SECTIONS

A. Section 07 60 00 – Flashing and Sheet Metal.

B. Section 07 65 00 – Flexible Flashings.

C. Section 07 92 00 – Joint Sealants: Perimeter sealants around installed storefront system.

D. Section 08 51 13 – Aluminum Windows: Windows installed within storefront system.

E. Section 08 71 00 – Door Hardware: Installation of lock cylinders.

F. Section 08 81 00 – Glass Glazing.

G. Section 10 71 13 – Exterior Sun Control Devices: Sunshades installed on storefront system.

1.4 LEED REQUIREMENTS

A. Refer to Section 01 35 13.20 for LEED requirements related to this Section.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazed storefront systems, including anchorage, capable of withstanding, without failure, the effects of the following:
   1. Structural loads.
   2. Thermal movements.
   3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   4. Dimensional tolerances of building frame and other adjacent construction.
   5. Failure includes the following:
      a. Deflection exceeding specified limits.
      b. Thermal stresses transferred to building structure.
      c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
      d. Noise or vibration created by wind and thermal and structural movements.
      e. Loosening or weakening of fasteners, attachments, and other components.
      f. Sealant failure.

B. Performance Requirements: At a minimum provide the following:
   1. Strength: Design system to withstand loads as required by California Building Code but not less than following minimum loading.
      a. Wind: Uniform inward and outward wind pressures based on 70 mph wind speed, Exposure ‘C’; pressures as calculated per current code requirements.
      b. Seismic: Conform with applicable codes. Size, fabricate, assemble and erect work to accommodate interstory drift (horizontal displacement) during a major seismic event.
   2. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   3. Window System Deflections and Thermal Movements: Size primary members for temperature variations as follows; fabricate, assemble and erect work to maintain limitations.
      a. Design for normal-to-wall deflection of L/175 of span; except L/250 of span for glass supporting members.
      b. Parallel-to-wall deflection of less than 75% of glass edge clearances.
      c. Thermal expansion and contraction movements resulting from not less than ambient temperature range of 100 degrees F, which may cause a material temperature range of 160 degrees F.
   4. Water and Air Leakage: Installed system shall be free of leakage of both water and air.
      a. Water leakage is defined as uncontrolled penetration of water (not including condensation) to interior of building.
      b. Air leakage is defined as infiltration of air at any area of window wall, at a rate in excess of 0.06 cfm/sf of area, based on measurement of single complete module of system.
   5. Condensation: Provide minimum tested Condensation Resistance Factor (CRF) of 45.

6. Energy Performance: Provide minimum U-Factor value of 0.445 for glazed window wall system, including frame, glazing and operable windows and doors.
7. **[Addendum 5] Acoustic Performance: Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:**
   a. 37 (STC) and 30 (OITC).

1.6 ACTION SUBMITTALS

A. Product Data: For each aluminum entrance and storefront system required, including:
   1. Manufacturer's standard details and fabrication methods.
   2. Data on finishing, hardware and accessories.
   3. Recommendations for maintenance and cleaning of exterior surfaces.

B. Shop Drawings: For each aluminum entrance and storefront system required, including layout and installation details, relationship to adjacent work, elevations at 1/4-inch scale, detail sections of typical composite members, anchors and reinforcement, hardware mounting heights, and glazing details.
   1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
   2. Include details of connections of sunshade system to exterior storefront.
   3. Identify miscellaneous brake shapes.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. LEED Submittals: See Section 01 35 13.20 for additional requirements; provide the following:
   1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
   2. Product Data for Credit IEQ 4.1: For installation adhesives, including printed statement of VOC content and chemical composition of each product used.

E. CALGreen Submittals: Provide product data for the following:
   1. Product Data for CALGreen 5.504.4.1 – Finish Material Pollutant Control; Adhesives, Sealants, and Caulks: For adhesives, sealants, and caulks, including printed statement of VOC content and chemical components.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.
   3. Expansion provisions.
   4. Glazing.
   5. Flashing and drainage.

G. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.
   1. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

H. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Detail fabrication and assembly of aluminum-framed systems.
   2. Include design calculations.

I. Product Substitutions: The Drawings indicate sizes, profiles, dimensional requirements, and aesthetic effects of aluminum windows and are based on the specific window types and models indicated. Other manufacturers whose products have equal performance characteristics may be considered provided deviations in size, profile, and dimensions are minor and do not alter the aesthetic effect.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

B. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and components, from manufacturer.
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

C. Source quality-control reports.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

B. Warranties: Sample of special warranties.

1.9 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical wall area as shown on Drawings.
   2. Coordinate with requirements for glazing listed in Section 08 81 00.
   3. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
   4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Manufacturer's Qualifications: Provide aluminum entrances and storefront systems produced by a firm experienced in manufacturing systems that are similar to those indicated for this project and that have a record of successful in-service performance.

C. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing entrance and storefront systems similar to those required for this Project and who is acceptable to manufacturer.

D. Professional Engineer Qualifications: A professional engineer who is licensed in California, where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of aluminum entrances and storefront systems that are similar to those indicated for this Project in material, design, and extent.

E. Engineering Responsibility: Prepare data for entrance and storefront systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

F. Single Source Responsibility: Obtain aluminum entrance and storefront systems from one source and from a single manufacturer matching aluminum window manufacturer specified in Section 08 51 13.

G. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
   1. Do not revise intended aesthetic effects, as judged solely by Architect, without Architect's approval. If revisions are proposed, submit comprehensive explanatory data comparing proposed substitution to named system, with substitution request to Architect for review.

H. Preinstallation Conference: Conduct conference at Project site.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum entrance and storefront components in the manufacturer's original protective packaging.

B. Store aluminum components in a clean dry location away from uncured masonry or concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.

C. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

1.11 PROJECT CONDITIONS

A. Field Measurements: Verify storefront openings by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating storefront components without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.12 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration caused by thermal movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Adhesive or cohesive sealant failures.
      e. Water leakage through fixed glazing and framing areas.
      f. Failure of operating components, including all door hardware and actuators.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LEED MATERIAL REQUIREMENTS, GENERAL

A. Recycled Content: Provide products made from the following metals with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than that indicated below:
   1. Steel: Average recycled content of steel to be a minimum 60 percent.
   2. Aluminum: Average recycled content of aluminum to be a minimum of 70 percent.

B. VOC Content: Adhesives and sealants applied on-site on the interior of the building and products used on the interior of the building shall comply with VOC limits as specified in Section 01 35 13.20 - Sustainable Design Requirements.
   1. Use materials that have the minimum VOC content in units of g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 MANUFACTURERS

A. Basis-of-Design Product: The design for the aluminum-framed storefront system is based on the manufacturer identified below. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
   1. Basis-of-Design: Kawneer Company, Inc.
      a. Exterior Aluminum Storefront System: Trifab 451T.
      b. Exterior Aluminum Window System: See Section 08 51 13.
      c. Interior Aluminum Storefront System: Trifab 451.
      d. Outrigger Sunshades: Versoleil SunShade Outrigger System.
   2. Arcadia, Inc.
   3. CR Laurence; U.S. Aluminum.
   4. Oldcastle BuildingEnvelope.

2.3 FRAMING SYSTEMS

A. Exterior Storefront System Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Construction: Thermally broken.
   2. Glass: Insulated units.
   3. Glazing System: Retained mechanically with gaskets on four sides.
   4. Glazing Plane: Offset to Front as indicated on Drawings.
   5. Framing: Shear-block system.
   6. Finish: Dark bronze aluminum anodized.

B. Interior Storefront System Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Construction: Non-thermal.
   2. Glass: Single lite units.
   3. Glazing System: Retained mechanically with gaskets on four sides.
   4. Glazing Plane: Offset to Front as indicated on Drawings.
   5. Framing: Screw spline system.
   6. Finish: Dark bronze aluminum anodized.

C. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
   1. Structural Shapes, Plates and Bars: ASTM A36/A36M.
   2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
   3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

D. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123.

1. Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splined grommet nuts.

E. Fasteners: Provide corrosion-resistant, nonstaining, nonbleeding fasteners of aluminum, nonmagnetic stainless steel, zinc plated steel, or other material warranted by the manufacturer to be non-corrosive and compatible with aluminum components, hardware, anchors and other components and adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Where exposed fasteners are unavoidable, use countersunk Phillips screw heads, finished to match framing system.
4. Exposed fasteners must have bonded neoprene washers or be sealed.

F. Concealed Flashing: 0.0179-inch (26 gage) minimum dead-soft stainless steel, or 0.026-inch-thick minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components and adjacent materials.

G. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 HORIZONTAL, FIXED, EXTRUDED-ALUMINUM SUN CONTROLS

A. Fixed, extruded-aluminum sun control assemblies complying with the following:
1. Basis-of-Design: Kawneer, Versoleil Outrigger and Single Blade Systems as indicated on Drawings.
2. Blade Type: Airfoil, extruded aluminum, alloy 6063-T5.
3. Blade Width: 6-inches.
4. Outrigger: Tapered side profile, aluminum plate, alloy 3031-T6.
5. Fascia: 4-inch round tube
6. Finish: Dark bronze.

2.5 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B209/B209M.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221/B221M.
3. Extruded Structural Pipe and Tubes: ASTM B429.
4. Structural Profiles: ASTM B308/B308M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates and Bars: ASTM A36.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

2.6 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal. Provide gasket assemblies that have corners sealed with sealant recommended by gasket manufacturer.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type in hardness recommended by system and gasket manufacturer to comply with system performance requirements.
1. Color: Black.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
1. Weatherseal Sealant: ASTM C920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
   a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   b. Color: Black.

F. Secondary Sealants and Joint Fillers: For use as weatherseal at perimeter of entrance and storefront systems, compatible with structural sealant and other system components with which it comes in contact, as listed in Section 07 92 00.
1. Color: As selected by Architect from manufacturer's full range of colors.

G. Miscellaneous Brake Shapes: Provide headers, closures, anchors and supports as indicated and required. Fabricate from minimum 0.090-inch aluminum unless otherwise indicated.

2.7 EXTERIOR ENTRANCE DOOR SYSTEMS

A. Stile-and-Rail Type Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods or j-bolts.

2. Design: As follows:
   a. Stile Design: Wide stile; over 4 inches (101.6 mm) wide.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
4. Bottom Rails: 10-inches.
5. Equip each door leaf with an adjusting mechanism located in the top rail near the lock stile, which provides for minor clearance adjustments after installation.

2.8 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.
   1. For installation of hardware components indicated to be provided by other than the aluminum entrance manufacturer refer to Section 08 71 00
   2. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
   3. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
   4. Opening-Force Requirements:
      a. Egress Doors: Not more than 5 lbf (22.2 N) to fully open door.

B. See Section 08 71 00 for Basis-of-Design manufacturers for door hardware.

C. Provide heavy-duty hardware units as indicated, scheduled, or required for operation of each door, including the following items of sizes, number, and type recommended by manufacturer for service required; finish to match door.

D. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

E. Continuous-Gear Hinges, Exterior Doors: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.

F. Pivot Hinges, Interior Doors: BHMA A156.4, Grade 1.
   1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
      a. Doors Over 7'-6": Provide one intermediate pivot.
      b. Doors 9'-0" and Over: Provide 2 intermediate pivots.

G. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.

H. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

I. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
   1. Finish back of exit device where visible through glazed doors.

J. Cylinders: As specified in Section 08 71 00. BHMA A156.5, Grade 1.
   1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".

K. ACAMS Hardware: As specified in Section 08 71 00. Coordinate with other door hardware and security systems.

L. Dustproof Strikes: BHMA A156.16, Grade 1; for each latch or lock bolt as recommended by door manufacturer; fabricated for aluminum framing..

M. Operating Trim: BHMA A156.6.

N. Concealed Overhead Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.

O. Concealed Overhead Holders: BHMA A156.8, Grade 1.

P. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

Q. Weatherstripping: Manufacturer's standard replaceable components installed around perimeter and along meeting stiles of doors.
   1. Compression Type: Made of ASTM E2203, molded neoprene, or ASTM D2287, molded PVC.
   2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

R. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

S. Silencers: BHMA A156.16, Grade 1.

T. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (13 mm).
   1. Provide one piece per door opening, ribbed, non-slip surface, of type to accommodate pivots; conforming to latest State of California accessibility regulations.

U. Pulls: Back-to-back mounted where no panic device is scheduled to be installed. Single pull on exterior side of door where panic device is indicated on schedule.
   1. Pull Style: Lever, to be selected by Architect.

V. Door Stop: Floor- or wall-mounted door stop, as appropriate, with integral rubber bumper; comply with ANSI A156.16, Grade 1.

2.9 FABRICATION, STOREFRONT SYSTEMS

A. Fabricate aluminum entrance and storefront components to designs, sizes and thicknesses indicated and to comply with indicated standards.
   1. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
   2. Provide sub-frames and reinforcing of types indicated or, if not indicated, as required for a complete system.
   3. Sizes and profile requirements are indicated on the Drawings. Variable dimensions are indicated, with maximum and minimum dimensions required, to achieve design requirements and coordination with other work.

B. Welding: Comply with AWS recommendations.
   1. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finished surfaces.
   2. Grind exposed welds smooth to remove weld spatter and welding oxides from exposed surfaces by descaling or grinding. Restore mechanical finish.

C. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the Project site. Disassemble components only as necessary for shipment and installation.

D. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
   8. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members.

E. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

F. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

G. Storefront Framing: Fabricate components for assembly using shear-block system. Stick framing is not permitted.

H. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.
2. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.
3. Provide for wiring within framing system to accommodate power-operated hardware where indicated on Drawings. Include cutouts, raceways, conduits, and other such provisions to permit a complete operating hardware system.

I. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. For exterior doors, provide compression weather stripping against fixed stops.
3. At exterior doors, provide weather sweeps applied to door bottoms.
4. Pre-glaze door units to greatest extent possible.

J. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
1. Do not drill and tap for surface-mounted hardware items until time of installation at Project Site.

K. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

L. Dissimilar Metals: Separate dissimilar metals with bituminous paint, or a suitable sealant, or a non-absorptive plastic or elastomeric tape, or a gasket between the surfaces. Do not use coatings containing lead.

2.10 FABRICATION, OUTRIGGER SUNSHADES

A. Assemble sun control assemblies in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Sun control assemblies shall be assembled entirely by welding. Join components with a minimum of two fillet welds, each 1-inch (25 mm) long produced with the Pulsed Gas Metal Arc welding (GMAW/MIG) process with minimum 0.125-inch (3.18 mm) throat.

C. Maintain equal sun control blade spacing, including separation between blades and frames to produce uniform appearance.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Join frame members to one another and to fixed sun control blades with fillet welds concealed from view, unless size of sun control assembly makes concealed, bolted connections between frame members necessary.

2.11 MISCELLANEOUS BRAKE SHAPE FABRICATION

A. Fabricate to profile indicated on Drawings.
   1. Aluminum Sheet: 0.063 inch (1.60 mm) minimum.

B. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush surfaces without cracking or grain separation at bends. Fold back exposed edges of unsupported sheet metal to form a 1/2-inch- (12-mm-) wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch (1 mm) and support with concealed stiffeners.

C. Coordinate dimensions and attachment methods of decorative formed metal items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

D. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use.
   1. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

E. Build in straps, plates, and brackets as needed to support and anchor fabricated items to adjoining construction. Reinforce decorative formed metal items as needed to attach and support other construction.

F. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install decorative formed metal items.

G. Conceal fasteners where possible; otherwise, locate where they are as inconspicuous as possible. Size fasteners to support closures and trim, with fasteners spaced to prevent buckling or waviness in finished surfaces.

H. Drill and tap holes needed for securing break shapes and trim to other surfaces.

I. Incorporate gaskets where indicated or needed for concealed, continuous seal at abutting surfaces.

J. Miter or cope trim members at corners and reinforce with bent metal splice plates to form tight joints.

2.12 STEEL REINFORCEMENT PRIMING

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying primer.

B. Surface Preparation: Perform manufacturer's standard cleaning operations to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel.

C. Priming: Apply manufacturer's standard corrosion-resistant primer immediately after surface preparation and pretreatment.

2.13 FINISHES

A. General: Comply with NAAMM "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to application and designations of finishes.

B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
1. Exterior Storefront Color: Dark Bronze.
2. Interior Storefront Color: Dark Bronze.
3. Exterior Sunshades: Dark Bronze.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and supports, with the Installer present, for compliance with requirements indicated, installation tolerances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

B. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:
1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels.
1. Install components in proper alignment and relation to established lines and grades indicated. Provide proper support and anchor securely in place.

C. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact mortar, concrete, or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3. Paint dissimilar metals where drainage from them passes over aluminum.
4. Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subject to wetting, with two coats of aluminum house paint. Seal joints between the materials with sealant.

D. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.

E. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

F. Install flexible flashings at perimeters of storefront as specified in Section 07 65 00.

G. Install glazing as specified in Section 08 81 00.
1. Install weatherseal sealant according to Division 07 Section "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

H. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Install entrances plumb and true in alignment with established lines and grades without warp or rack.
3. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
    a. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.
4. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.

I. Install perimeter joint sealants as specified in Section 07 92 00 to produce weathertight installation.

J. Erection Tolerances: Install aluminum entrance and storefront to comply with the following maximum tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment:
    a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
    b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

K. Refer to Section 08 81 00 for installation of glass and other panels indicated to be glazed into framing and doors that are not pre-glazed by manufacturer.

1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
2. Install structural silicone sealant according to sealant manufacturer's written instructions.
3. Mechanically fasten glazing in place until structural sealant is cured.
4. Remove excess sealant from component surfaces before sealant has cured.

L. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

M. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants," unless otherwise indicated.

N. Connections: Connect electrical hardware to building electrical and security systems.

3.3 INSTALLATION

A. Install exterior sun control assemblies in accordance with manufacturer's instructions.

B. Locate and place sun control assemblies level, plumb, and at indicated alignment with adjacent work.

C. Do not install damaged components.

D. Form closely fitted joints with exposed connections accurately located and secured, and with hairline joints free of burrs and distortion.

E. Rigidly secure non-movement joints.

F. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

G. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.

H. Seal joints watertight where shown on approved shop drawings and/or manufacturer's standard installation instructions.

I. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

J. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections.

B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
   1. Water Penetration: Areas shall be tested according to ASTM E1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft. (200 Pa), and shall not evidence water penetration.
   2. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet (23 m) by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

C. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

E. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Water Penetration Test: After completion of the installation and nominal curing of sealants, test entrances and storefronts for water leaks in accordance with ASTM E1105 at a minimum uniform static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft. (200 Pa), and shall not evidence water penetration.

B. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet (23 m) by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

C. Conduct tests in presence of Architect and Owner. Correct deficiencies observed as a result of this test.

D. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

E. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

G. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.
   1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch, measured to the leading door edge.

3.7 CLEANING

A. Construction Waste Management: Manage construction waste in accordance with provisions of Section **[ADDENDUM 3] 01 35 13.26** Construction Waste Management. Submit documentation for Credit MR 2 to satisfy the requirements of that Section.

B. Clean the completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings. Remove excess sealant and glazing compounds, and dirt from surfaces.

C. Clean glass surfaces after installation, complying with requirements contained in Section 08 81 00 for cleaning and maintenance. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

3.8 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 08 41 13

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[ADDENDUM 5] SECTION 32 13 43

PERMEABLE UNIT PAVERS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:
1. Permeable interlocking concrete pavers.
2. Crushed stone bedding material.
3. Open-graded subbase aggregate.
4. Open-graded base aggregate.
5. Bedding and joint/opening filler materials.
6. Geotextiles.

1.2 RELATED DOCUMENTS

Revised Final Report – Geotechnical Investigation Proposed Cherryland Community Center prepared by Rockridge Geotechnical dated July 17, 2017

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. C 131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
2. C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
3. C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
4. D 448, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
5. C 936, Standard Specification for Solid Interlocking Concrete Pavers.
6. C 979, Specification for Pigments for Integrally Colored Concrete.
7. C 1781, Standard Test Method for Surface Infiltration Rate of Permeable Unit Pavement Systems
8. D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12 in. (305 mm) drop.
9. D 1557, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18 in. (457 mm) drop.
10. D 2922 Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).
11. D 4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
12. D 6758, Standard Test Method for Measuring Stiffness and Apparent Modulus of Soil and Soil-Aggregate In-Place by Electro-Mechanical Method
13. E 2835, Standard Test Method for Measuring Deflections using a Portable Impulse Plate Load Test Device

B. Interlocking Concrete Pavement Institute (ICPI)

1. Permeable Interlocking Concrete Pavement manual.
2. Permeable Design Pro software for hydrologic and structural design.

1.4 SUBMITTALS

A. Paver manufacturer's/installation subcontractor's drawings and details: Indicate perimeter conditions, junction with other materials, expansion and control joints, paver layout, patterns, color arrangement, installation and setting details. Indicate layout, pattern and relationship of paving joints to fixtures, and project formed details.

B. Minimum 3 lb samples of subbase, base and bedding aggregate materials.

C. Sieve analysis of aggregates for subbase, base and bedding materials per ASTM C 136.

D. Project specific or producer/manufacturer source test results for void ratio and bulk density of the base and subbase aggregates.

E. Soils report indicating density test reports, classification, and infiltration rate measured on-site under compacted conditions, and suitability for the intended project.

F. Erosion and sediment control plan.

G. Stormwater management (quality and quantity) calculations; structural analysis for vehicular applications using ICPI Permeable Interlocking Concrete Pavements manual or Permeable Design Pro.

H. Permeable concrete pavers:
   1. Paver manufacturer's catalog sheets with product specifications.
   2. Four representative full-size samples of each paver type, thickness, color, and finish. Submit samples indicating the range of color expected in the finished installation.
   3. Accepted samples become the standard of acceptance for the work of this Section.
   4. Laboratory test reports certifying compliance of the concrete pavers with ASTM C 936.
   5. Manufacturer's certification of concrete pavers by ICPI as having met applicable ASTM standards.
   6. Manufacturers' material safety data sheets for the safe handling of the specified paving materials and other products specified herein.
   7. Paver manufacturer's written quality control procedures including representative samples of production record keeping that ensure conformance of paving products to the product specifications.

I. Paver Installation Subcontractor:
   1. Demonstrate that job foremen on the project have a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.
   2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.
   3. Written Method Statement and Quality Control Plan that describes material staging and flow, paving direction and installation procedures, including representative

reporting forms that ensure conformance to the project specifications. quality assurance

1.5 QUALITY ASSURANCE

A. Paver Installation Subcontractor Qualifications:
   1. Utilize an installer having successfully completed concrete paver installation similar in design, material and extent indicated on this project.
   2. Utilize an installer with job foremen holding a record of completion from the Interlocking Concrete Pavement Institute PICP Installer Technician Course.

B. Review the manufacturers' quality control plan, paver installation subcontractor's Method Statement and Quality Control Plan with a pre-construction meeting of representatives from the manufacturer, paver installation subcontractor, general contractor, engineer and/or owner's representative.

C. Mock-Ups:
   1. Install a 10 ft x 10 ft paver area.
   2. Use this area to determine surcharge of the bedding layer, joint sizes, and lines, laying pattern, color and texture of the job.
   3. This area will be used as the standard by which the work will be judged.
   4. Subject to acceptance by owner, mock-up may be retained as part of finished work.
   5. If mock-up is not retained, remove and properly dispose of mock-up.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged container packaging with identification tags intact on each paver bundle.
   1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
   2. Deliver concrete pavers to the site in steel banded, plastic banded, or plastic wrapped cubes capable of transfer by forklift or clamp lift.
   3. Unload pavers at job site in such a manner that no damage occurs to the product or existing construction

C. Storage and Protection: Store materials in protected area such that they are kept free from mud, dirt, and other foreign materials.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not install in rain or snow.

B. Do not install frozen bedding materials.

1.8 LEED REQUIREMENTS

A. Refer to Section 01 35 13.20 for LEED requirements related to this Section.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.
   1. Compressive Strength: 8000 psi average with minimum 7,200 psi.
   2. Absorption: 5 percent average, with maximum of 7 percent.
   3. Pigment in accordance with ASTM C 979.
   4. Manufacture materials in individual layers on production pallets.
   5. Manufacture materials to produce solid homogeneous matrix in produced unit.

B. Manufacturers:
   1. Basis-of-Design Product: Acceptable manufacturers include Pavestone and Unlock. Provide the named product or a comparable product as approved by Landscape Architect:
   2. Overall Dimension and Thickness: 2.4 in 3.9 in x 7.8 in.
   3. Color: As selected by Landscape Architect.

C. Units shall be sound and free of defects that would interfere with proper placement of unit or impair strength or performance of construction.

D. Minor cracks incidental to usual methods of manufacture, or chipping resulting from customary shipment and delivery shall not be deemed grounds for rejection.

2.2 CRUSHED STONE FILLER, BEDDING, BASE AND SUBBASE

A. Crushed stone with 90% fractured faces, LA Abrasion < 40 per ASTM C 131.

B. Do not use rounded river gravel for vehicular applications.

C. All stone materials shall be washed with less than 2% passing the No. 200 sieve.

D. Joint/opening filler, bedding, base and subbase: conforming to ASTM D 448 gradation as shown in Tables 1, 2 and 3 below:

Table 1 – ASTM No. 8 Bedding and Joint/Opening Filler Grading Requirements

Sieve Size	Percentage Passing Sieve
1/2 in.	100
3/8 in.	85 to 100
No. 4	10 to 30
No. 8	0 to 10
No. 16	0 to 5

Table 2 – ASTM No. 57 Base Grading Requirements

Sieve Size	Percentage Passing Sieve
1-1/2 in.	100
1 in.	95 to 100
1/2 in.	25 to 60
No. 4	0 to 10
No. 8	0 to 5

Table 3 – ASTM No. 2 Aggregate Grading Requirements

Sieve Size	Percentage Passing Sieve
3 in.	100
2-1/2 in.	90 to 100
2 in.	35 to 70
1-1/2 in.	0 to 15
3/4 in.	0 to 5

2.3 GEOGRID

A. Geogrid shall be in conformance with Section 88 of the State Standard Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Site Verification of Conditions:
   1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers.
      a. Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
      b. Provide written density test results for soil subgrade to the Owner, General Contractor and paver installation subcontractor.
      c. Verify location, type, and elevations of deep curb, utility structures, and drainage pipes and inlets.
   2. Do not proceed with installation of bedding and interlocking concrete pavers until subgrade soil conditions are corrected by the General Contractor or designated subcontractor

3.2 PREPARATION

A. Verify that the soil subgrade is free from standing water.

B. Stockpile joint/opening filler, base and subbase materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.

3.3 INSTALLATION

A. General
1. Conform to the requirements set forth in the geotechnical investigation report.
2. Any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities shall be removed before application of the geogrid and subbase materials.
3. Keep area where pavement is to be constructed free from sediment during entire job. Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.
4. Do not damage drainpipes, overflow pipes, observation wells, or any inlets and other drainage appurtenances during installation. Report any damage immediately to the project engineer.

B. Geogrid
1. Place on top of soil subgrade. Secure in place.

C. Open-graded subbase and base
1. The No. 2 aggregate subbase course should be placed in lifts not exceeding 6 inches in loose thickness and compacted using a smooth-drum roller, operated in static (non-vibratory) mode.
2. The No. 57 aggregate may be placed in one lift and should be compacted with a smooth-drum roller in vibratory mode with sufficient passes to create an unyielding surface.
3. Placement and compaction of the permeable aggregate base and subbase should be performed under the observation of our field engineer.
4. Following compaction of the No. 57 aggregate, the No. 8 bedding, not exceeding 2 inches in loose thickness, should be placed and screeded to a level, undisturbed surface immediately prior to paver installation.

D. The surface tolerance the compacted No. 57 base should not deviate more than. ±1 in. over a 10 ft straightedge.

E. Bedding layer
1. Moisten, spread and screed the No. 8 stone bedding material.
2. Fill voids left by removed screed rails with No. 8 stone.
3. The surface tolerance of the screeded No. 8 bedding layer shall be ±3/8 in over a 10 ft straightedge.
4. Do not subject screeded bedding material to any pedestrian or vehicular traffic before paving unit installation begins.

F. Permeable interlocking concrete pavers and joint/opening fill material
1. Lay the paving units in the pattern(s) and joint widths shown on the drawings. Maintain straight pattern lines.
2. Fill gaps at the edges of the paved area with cut units. Cut pavers subject to tire traffic shall be no smaller than 1/3 of a whole unit.
3. Cut pavers and place along the edges with a double-bladed splitter or masonry saw.

4. Fill the openings and joints with No. 8, No. 89, or No. 9 stone.
5. Remove excess aggregate on the surface by sweeping pavers clean.
6. Compact and seat the pavers into the bedding material using a low-amplitude, 75-90 Hz plate compactor capable of at least 5,000 lbf. This will require at least two passes with the plate compactor.
7. Do not compact within 6 feet of the unrestrained edges of the paving units.
8. Apply additional aggregate to the openings and joints if needed, filling them completely. Remove excess aggregate by sweeping then compact the pavers. This will require at least two passes with the plate compactor.
9. All pavers within 6 feet of the laying face must be left fully compacted at the completion of each day.
10. The final surface tolerance of compacted pavers shall not deviate more than ±3/8 under a 10 feet long straightedge.
11. The surface elevation of pavers shall be 1/8 to 1/4 in. above adjacent drainage inlets, concrete collars or channels.

3.4 FIELD QUALITY CONTROL

A. After sweeping the surface clean, check final elevations for conformance to the drawings.

B. Lippage: No greater than 1/8 in. difference in height between adjacent pavers.

C. The surface elevation of pavers shall be 1/8 to 1/4 in. above adjacent drainage inlets, concrete collars or channels.

D. Bond lines for paver courses: ±½ in. over a 50 feet string line.

E. Verify the surface infiltration at a minimum of 100 in./hour using test method C 1781.

3.5 PROTECTION

A. After work in this section is complete, the General Contractor shall be responsible for protecting work from sediment deposition and damage due to subsequent construction activity on the site.

B. PICP installation contractor shall return to site after 6 months from the completion of the work and provide the following as required: fill paver joints with stones, replace broken or cracked pavers, and re-level settled pavers to initial elevations. Any additional work shall be considered part of original bid price and with no additional compensation.

3.6 CLEANING

A. Construction Waste Management: Manage construction waste in accordance with provisions of Section 01 74 19 Construction Waste Management and Disposal. Submit documentation for Credit MR 2 to satisfy the requirements of that Section.

END OF SECTION 32 13 43

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