SFWD – HEADQUARTERS AT 2000 MARIN

DATE: **04/10/26**

SUBJECT: **SFWD HEADQUARTERS AT 2000 MARIN**
ARTS BID SET

NARRATIVE SUMMARY:

ISSUANCE 53 – SFAC Art Glass Bid Set

Major revisions to the steel armature for support of art glass (ART sheets) are as follows:

- **Revised steel detailing at West Façade to shift art glass closer to concrete garage structure to avoid PG&E power lines and clarify limitations created by minimum installation clearances around power lines.**
- **Deleted support for 20 glass panels at West Façade between G11-G12 and adjusted curvature at lowest remaining glass panel (G12 at Lvl. 2).**
- **Added sheet ART5.4 for additional details at West Elevation.**
- **Adjusted dimensions and details to coordinate art glass design intent relative to aluminum fins.**
- **Modified details to accommodate ACI variation at concrete slab edges (RFI-0348)**

Revised sheets are listed below:

160 – PARKING ART – STEEL - ART

ART1.1	STRUCTURAL ABBR., SHEET INDEX, SPECIAL INSPECTION CHECKLIST & GENERAL NOTES
ART3.1	EXTERIOR ELEVATIONS GLASS PANEL SUPPORTS
ART3.2	TRANSVERSE SECTIONS
ART5.1	DETAILS
ART5.2	DETAILS
ART5.3	DETAILS
ART5.4	WEST ELEVATION DETAILS

SAN FRANCISCO ARTS COMMISSION
ARTWORK TECHNICAL SPECIFICATIONS
WALTER KITUNDU | *THOSE WHO CARRY WATER*
SAN FRANCISCO WATER DEPARTMENT AT 2000 MARIN

Specification: ARTWORK POINT SUPPORTED STRUCTURAL GLASS FABRICATION

PART 1 - GENERAL

1.01 STYLE AND NATURE OF THIS SPECIFICATION

This document is written in the directive style. Where an obligation is given and it is not stated who is to undertake these obligations, it is to be undertaken by the Artwork Glass Fabrication Sub-Contractor (Fabricator). This Specification governs the fabrication of an artist-designed permanent artwork commissioned by the San Francisco Arts Commission (SFAC). All obligations include preserving the aesthetic intent and visual integrity of the Artist's approved design.

This document shall be read as a whole. No one section should be isolated or read to be all inclusive of any information related to the topic of that section.

This Specification forms part of the Contract Documents of a supply package. This Specification together with the Drawings define the Scope of Work, mandatory geometry of the Artwork, performance parameters for the Point Supported Glass and Point Supported Glass Hardware, minimum acceptable standards and establishes a regime for verification of the fabrication and delivery of glass processes.

1.02 CLARIFICATION OF GLASS FABRICATION AND GLASS INSTALLATION SUB-CONTRACTOR ROLES

Fabrication of the glass and installation are procured separately. The fabrication, shipping and delivery of the Artwork Glass is a separate and independent contract under the San Francisco Arts Commission (SFAC) that includes these specifications for the Artwork Glass Fabrication Sub-Contractor (Fabricator).

The receipt and installation of the Artwork Glass and the procurement of the Point Supported Glass Hardware by the Artwork Glass Installation Sub-Contractor (Installer) is under a separate and independent contract that does not include these specifications.

It is assumed that the Installer and Fabricator may not be the same entity. The Fabricator shall fully review the ARTWORK POINT SUPPORTED STRUCTURAL GLASS INSTALLATION specifications and confirm their understanding of the ARTWORK POINT SUPPORTED STRUCTURAL GLASS INSTALLATION specifications in writing to SFAC. The Installer and the Fabricator shall coordinate their respective scopes. The Fabricator shall notify SFAC of any comments concerning their scope and coordination of their scope with the Installer.

The Artwork Glass Fabrication Sub-Contractor shall procure the Artwork Glass and be responsible for the shipping and delivery of the Artwork Glass including coordination with the supporting building structure to fully comply with the Contract Documents' requirements and the Artist's intent. The Fabricator shall coordinate all communication through the SFAC Public Art Project Manager. Direct contact with the Artist shall occur only when authorized in writing by SFAC.

The Artwork Glass Installation Sub-Contractor shall procure the glass hardware, be responsible for the handling (receipt and storage) of the Artwork Glass, and be responsible for the erection of the Artwork

including coordination with the supporting building structure to fully comply with the Contract Documents' requirements and the Artist's intent.

1.03 SUMMARY

A. This section relates to the point supported glass Artwork design, fabrication, shipping, and delivery.

B. The Artwork Glass Fabrication Sub-Contractor (Fabricator) scope shall include, but not necessarily be limited to, Artwork Glass fabrication, Artwork Glass testing, Artwork Glass shipping, and delivery of the Artwork Glass (Point Supported Glass).

C. The Artwork Glass Fabrication Sub-Contractor (Fabricator) scope shall also include, but not necessarily be limited to, coordination with the Artwork Glass Installation Sub-Contractor (Installer), coordination with the Point Supported Glass Hardware, and coordination with the attachments to the Armature.

D. The scope includes Artwork Glass for the Point Supported Glass System including all labor, materials, engineering, equipment and services necessary to complete the structural wall as shown on the Contract Documents, including, but not limited to, the following:

1. Procurement of the Point Supported Glass.
2. Glass fabrication, testing, packaging and delivery approved by the Artist and SEOR.
3. Fabrication, color rendering, and surface finish shall maintain full fidelity to the Artist's approved imagery and samples.
4. Coordination with the Installer for tolerances, the Point Supported Glass Hardware, handling and storage, erection sequences and attachments to the Armature.
5. Coordination with the Installer for the mock-up.

E. Related Sections

1. Drawings, General and Supplementary Conditions of the Contract, and the following Specification Sections, apply to this Section.
2. ARTWORK POINT SUPPORTED STRUCTURAL GLASS INSTALLATION Specification
3. SAN FRANCISCO ARTS COMMISSION ARTWORK COORDINATION RFP.
4. Applicable and relevant Arts Commission project specifications.

1.04 REFERENCES

A. The Fabricator is responsible to adhere to the following references pertaining to Artwork Glass fabrication, Artwork Glass shipping, and delivery of the Artwork Glass (Point Supported Glass).
B. ARTWORK POINT SUPPORTED STRUCTURAL GLASS INSTALLATION specification.
C. SAN FRANCISCO ARTS COMMISSION ARTWORK COORDINATION RFP
D. The most current version of the codes and standards shall be used.
E. American Architectural Manufacturer's Association:
   1. AAMA 501 – Methods of Tests for Exterior Walls.
   2. AAMA TIR-A9 - Design Guide for Metal Cladding Fasteners

F. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

G. ASTM International (ASTM):

1. ASTM A743 - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.

2. ASTM C158 - Standard Test Methods for Strength of Glass by Flexure (Determination of Modulus of Rupture).
3. ASTM C162 - Standard Terminology of Glass and Glass Products.
4. ASTM C1036 - Standard Specification for Flat Glass.
5. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
6. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
7. ASTM C1279 - Standard Test Method for Non-Destructive Photoelastic Measurement of Edge and Surface Stresses in Annealed, Heat-Strengthened, and Fully Tempered Flat Glass.
8. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
9. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
10. ASTM E1300 Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load.
11. ASTM F738 Standard Specification for Stainless Steel Metric Bolts, Screws, and Studs.

H. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

I. Consumer Product Safety Commission CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

J. European Standards (EN):

1. EN 572 – Glass in Building – Basic Soda Lime Silicate Glass Products.
2. EN 1288-3 – Glass in building — Determination of the bending strength of glass - Part 3 - Test with specimen supported at two points (four point bending).
3. EN 12150 Glass in building - Thermally toughened soda lime silicate safety glass.
4. EN 12543 – Glass in Building – Laminated Glass and Laminated Safety Glass.
5. EN 14179 – Glass in building - Heat soaked thermally toughened soda lime silicate safety glass.

K. Fenestration and Glazing Industry Alliance (FGIA).

L. Glass Association of North America (GANA): Glazing manual.

M. Glass Association of North America (GANA): Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.

N. Glass Association of North America (GANA): Glass Information Bulletin GANA TD-02-0402 – Heat-Treated Glass Surfaces Are Different.

O. National Accreditation and Management Institute, Inc. (NAMI).

P. National Glass Association (NGA).

DEFINITIONS

A. Annealed Glass: Glass in its unprocessed form without internal stresses caused by heat treatment, such as rapid cooling, or by toughening or heat strengthening.

B. Armature: Structural steel framing and connections to reinforced concrete Garage structure to support the Artwork.

C. Artist: A person that designs and fabricates the Artwork, under the supervision of the San Francisco Arts Commission.

D. Artwork: Vertical Point Supported Glass and Point Supported Glass Hardware with Artist-designed graphics integrated into architectural glass panels installed on the façade of the Infrastructure Facility employee Garage. The Artwork will include colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.

E. Artwork Glass: Vertical Point Supported Glass with Artist-designed graphics integrated into architectural glass panels by the Artwork Glass Fabrication Sub-Contractor for installation on the façade of the Infrastructure Facility employee Garage by the Artwork Glass Installation Sub-Contractor. The Artwork Glass will include colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.

F. Artwork Glass Fabrication (Fabrication): Includes the procurement, shipping and delivery of the Artwork Glass including coordination with the Artwork Glass Installation Sub-Contractor (Installer) and coordination with the Armature and supporting building structure.

G. Artwork Glass Fabrication Sub-Contractor (Fabricator): Sub-Contractor responsible for the procurement, shipping and delivery of the Artwork Glass including coordination with the Artwork Glass Installation Sub-Contractor (Installer) and coordination with the Armature and supporting building structure.

H. Artwork Glass Installation (Installation): Includes Artwork Glass handling (receipt and storage), procurement of the Point Supported Glass Hardware, Artwork installation, and attachments to the Armature including coordination with the Artwork Glass Fabrication Sub-Contractor (Fabricator) and coordination with the supporting building structure.

I. Artwork Glass Installation Sub-Contractor (Installer): Sub-Contractor responsible for the procurement of the glass hardware, handling (receipt and storage), and erection of the Artwork including coordination with the Artwork Glass Fabrication Sub-Contractor (Fabricator) and the coordination with the supporting building structure.

J. Artwork Review Sample: Full-scale glass test panel demonstrating color, translucency, and finish for Artist and SFAC approval.

K. City Representative: A person overseeing construction activity for the City and County of San Francisco.

L. Client: Otherwise known as the project Owner, the client is the end purchaser of the works, who holds the main building contract with the main building contractor.

M. Contract: For the purposes of this specification, the term “Main Contract” can be taken to mean “subcontract” or “Artwork Subcontract”. Also Refer to Artwork Glass Fabrication Sub-Contractor.

N. Contract Documents: Drawings and specifications, drawing notes, and construction administration documents (RFI responses, submittals and submittal responses, and approved substitutions) that define the scope for the point supported glass and the point supported glass hardware.

O. Float Glass: A sheet of glass made by floating molten glass on a bed of molten metal. This gives the glass uniform thickness and very flat surfaces. Float glass is slowly cooled to produce annealed glass.

P. Fully Tempered Glass: Glass that has been heat-treated using the horizontal (roller hearth) method and complies with ASTM C1048, Type I, Class 1 (clear).

Q. Garage: Infrastructure Facility employee parking structure.

R. Glass Lite: Individual glass element before lamination into glass panel.

S. Glass Panel: Laminated glass panel with integrated Artwork. For this specification, glass panel and glass unit are the same.

T. Heat Soaked Glass: Glass that has been tested using heat soaking. The heat soak test or heat soak process is used to minimize the risk of spontaneous breakage of tempered glass caused by nickel sulfide (NiS) inclusions.

U. Heat Strengthened Glass: Produced with surface and edge compression levels that are lower than fully tempered glass. Heat strengthened glass does not meet safety glazing requirements.

V. Infrastructure Facility: The new San Francisco Water Department campus at 2000 Marin Street, San Francisco, CA, 94124.

W. Laminated Glass: A type of safety glass that is made by bonding two or more layers of glass together with layers of polyvinyl butyral (PVB) or ionoplast (SentryGlas). This creates a single sheet of glass. When broken, the interlayer keeps glass layers bonded and prevents them from breaking apart. The added rigidity and stiffness of SentryGlas allows it to maintain its structural integrity even when fully broken.

X. Main Contract: The contract between the Client and the Artwork Glass Fabrication Sub-Contractor (or Main Building Contractor) for the entire project works defined by the scope of works detailed in this specification and the Contract Documents.

Y. Main Building Contractor: The contractor responsible for delivering the scope of work for the Garage structure and the Armature, in coordination with this specification. For this specification, Main Building Contractor and General Contractor are the same.

Z. Point Supported Glass: Structural Artwork Glass with corner and edge point fittings supported by the steel Armature that connects to the reinforced concrete Garage structure with laminated fully tempered (FT) glass continuously open gaps on all sides.

AA. Point Supported Glass Hardware: All the components (hardware) to capture the glass and to connect to the steel framing Armature including the spider fittings, glass attachments, gaskets, etc.

BB. Point Supported Glass System: Includes the Point Supported Glass, the Point Supported Glass Hardware and coordination with the connections to the Armature.

CC. Public Art Project Manager: The person that represents the San Francisco Arts Commission Public Art Program.

DD. Safety Glass: Glass that has been tempered or laminated and is less likely to cause injury due to its additional strength and break pattern.

EE. San Francisco Arts Commission (SFAC): The Charter-established City agency that has jurisdiction over all art belonging to the City and charged with the preservation and care of this Artwork.

FF. San Francisco Arts Commission Public Art Program: The department responsible for the commissioning of permanent public Artworks to be accessioned into the Civic Art Collection as required by the City's Art Enrichment Ordinance.

GG. SEOR: Structural Engineer of Record licensed in the State of California in responsible charge of the structural engineering content of the Contract Documents.

HH. SFAC Public Art Project Manager: City representative administering design intent, reviews, and acceptance for the Artwork.

II. Spider Fitting: 316 Grade stainless steel single, double, triple and four arm fittings used to attach glass panels to the supporting Armature.

JJ. Tempered Glass: A form of safety glass that has been heat-treated to have either a minimum surface compression of 10,000 psi or an edge compression not less than 9,700 psi in accordance with the requirements of ASTM C 1048.

KK. Toughened Glass: Alternative name for tempered glass, commonly used outside of North America. See tempered glass definition.

LL. Works (or Work): Entire Artwork scope and requirements including the Point Supported Glass, Point Supported Glass Hardware with all of the components to connect to the supporting Armature and coordination with the Armature.

1.05 SCOPE OF WORK

The Artwork consists of vertical Point Supported Glass with Point Supported Glass Hardware. The Artwork is comprised of multiple sections of variable widths distributed on the north, west, and south sides of the building. Each Artwork section is comprised of individual glass panels. The laminated glass panels have colored enamels digitally printed onto float glass designed by the Artist. Color will be fired to the glass to form a permanent bond. The scope for this specification includes the Artwork Glass.
Required coordination included in this specification scope are coordination with Artwork Glass Installation Sub-Contractor (Installer) and coordination with all of the components to connect to the supporting Armature. The supporting Armature is under a separate contract.

A. Artwork Glass Fabrication Sub-Contractor: The Artwork documentation prepared by Danziger Engineering Collaborative and Tipping show the design, requirements and construction details. The Artwork Glass Fabrication Sub-Contractor shall supply, fabricate, ship and deliver the Artwork Glass, in accordance with the design intent of the Contract Documents securing all necessary permissions and agreements for the Works included in this specification including, but not limited to, the following:

   1. Mock-ups, test samples, testing and test reports.
   2. Interfaces with the Point Supported Glass Hardware and the Armature.
   3. Review and verification of Artwork Glass construction loads.
   4. Glass test reports and new glass tests, if required.
   5. Fabrication, shipping and delivery of the Artwork Glass, including all temporary works required.
   6. One small-format sample panel or frit test tile shall be retained by SFAC for archival reference.

B. SFAC's approval of the Artwork Glass Fabrication Sub-Contractor's documents shall be limited to:

   1. Confirmation of all basic design parameters.

2. The Artwork Glass Fabrication Sub-Contractor 's quality control program.

3. The visual effect.

C. The Artwork Glass Fabrication Sub-Contractor shall meet the requirements for interfacing with the Point Supported Glass Hardware and the Armature as outlined in the Contract Documents.

D. The Artwork Glass Fabrication Sub-Contractor shall provide all necessary hardware for accurate and safe storage and handling of the Artwork Glass. They shall be designed to accommodate generous on-site adjustment and thermal movement to protect the Artwork Glass prior to installation.

1.06 PERFORMANCE REQUIREMENTS

A. The Fabricator is responsible to adhere to the following performance requirements pertaining to Artwork Glass fabrication, Artwork Glass shipping, and delivery of the Artwork Glass (Point Supported Glass). The Fabricator shall coordinate these performance requirements with the Artwork Glass Installation Sub-Contractor (Installer) and inform SFAC and the SEOR of any performance requirements that are not being met by either the Fabricator or the Installer.

B. Testing: All requirements in this specification shall be proven exclusively by physical testing methods per the testing requirements in this specification.

C. The Artwork Glass, as erected, shall meet or exceed the following structural and weather resistance requirements:

1. 25 years with minimum maintenance (apart from regular cleaning).

2. Glass to have a minimum factor of safety of 2.5 with a maximum probability of breakage of 8 lites/ 1000 lites at design wind loading.

3. Glass surfaces shall allow for installation and maintenance loading applied by installers, window cleaners and associated equipment.

D. All Point Supported Glass shall be fabricated such that effective maintenance and replacement of these elements can be carried out without damaging adjacent components.

E. Each of the glass panels is to be supported by spiders and glass attachments positioned with edge distance as per Contract Documents.

F. Finished Tolerances:

1. Glass: ±1mm in plan.

2. Alignment between adjacent glass lites: ±1mm.

G. The Artwork Glass Fabrication Sub-Contractor shall be required to coordinate with the Artwork Glass Installation Sub-Contractor for the building superstructure tolerances including the tolerances for the Armature and the Garage Structure.

H. The Artwork Glass Fabrication Sub-Contractor shall be required to coordinate with the Artwork Glass Installation Sub-Contractor to allow for the worst combination of tolerances.

I. All visible surfaces of the glass shall be free of roller wave, scratches, or optical distortion when viewed in natural daylight at 10 ft. Color variation shall be within agreed variation from approved sample(s).

1.07 SUBMITTALS

A. Submit under provisions of the SAN FRANCISCO ARTS COMMISSION ARTWORK COORDINATION RFP requirements.

B. Prior to commencement of fabrication, the Artwork Glass Fabrication Sub-Contractor shall obtain and submit to the San Francisco Arts Commission (SFAC) certification from the manufacturer of each material that the material is of the correct grade, strength, size, finish etc., and that all applied coatings, finishes and the like have been applied to the relevant standards and requirements specified herein.

C. The Artwork Glass Fabrication Sub-Contractor shall provide written confirmation that they have reviewed and understand the ARTWORK POINT SUPPORTED STRUCTURAL GLASS INSTALLATION specifications.

D. The Artwork Glass Installation Sub-Contractor shall provide written confirmation that the procured Artwork Glass meets the requirements of the specification and all associated codes and standards, in a form acceptable to the SEOR.

E. Provide written confirmation that the Point Supported Glass Hardware, procured by the Artwork Glass Installation Sub-Contractor, is compatible with the Artwork Glass.

F. The Artwork Glass Fabrication Sub-Contractor shall prepare a schedule of materials to be used on the project. Materials schedule shall be updated and submitted to SFAC.

G. Provide a copy of safety marking and proposed location on glass. Safety markings need to be legible for the building inspector.

H. Provide breakage rates and certification for the heat-soak testing per 2.02.H. of this specification.

I. Proposed Testing: Submit a report with descriptive narrative and diagrams for proposed tests to be performed to supplement the information from any previous testing and to comply with the testing requirements of this specification

J. Artwork Glass Test Data: Submit test reports from an independent laboratory certifying that the Artwork Glass proposed for use has been tested.

K. Previous Testing: Submit copies of tests and valid certifications previously performed on proposed systems. The Point Supported Glass previously tested must be similar in type of materials and design as that shown on the Contract Documents utilizing attachments through holes in the glass. Include statement of any differences between the proposed system and the tested systems for which previous tests and valid certifications are submitted. Provide evidence of structural performance testing that the Artwork Glass proposed is comparable to the previously tested glass considering the following project specific loads, environment, and performance requirements:

1. Service loads:
    a. Live load 5 psf (lbs/square foot) applied normal to the glass surface and 200 lbs point live load applied anywhere (construction, access and maintenance loads to be confirmed).
    b. Wind Load 35.3 psf (lbs/square foot) applied normal to the glass surface.
    c. Seismic Loads 180%g.
2. External Environment:
    a. Temperature Range Ambient: 0°C to 40°C.
    b. Surface Allowance: -5°C to 80°C.
    c. Structural Members: ±25°C from ambient at installation.
3. Structural performance as tested in accordance with ASTM E330, or other approved method, with no glass breakage or permanent damage to fasteners, anchors, hardware, or actuating

mechanisms. All loads and thermal expansion forces for the in-service conditions with the following maximum deflections:

a. Normal wall deflection not exceeding 1/175 of clear span for span lengths of 162 inches (4115 mm) or less and 1/240 plus 1/4 inch (6 mm) for others. Deflection limited to 3/4 inch (19 mm) maximum for individual glass panels.

b. Parallel to wall deflection not exceeding 75 percent of glass edge clearance. Restrict deflection to L/360 or 1/8 inch (3 mm) maximum.

c. Deflection of the entire assembly, including, but not limited to, glass, not to exceed 1-1/2 inches (38 mm).

d. Acceptable evidence of these deflection limits for any proposed substitutions to the Contract Documents shall be by calculation submitted to the SEOR.

4. Supporting Structure Movements: The Artwork Point Supported Glass System shall accommodate movements of the supporting structure of the Garage and the Armature for the Artwork relating to the following loading conditions:

a. Dead Load: span/240 maximum, where the span is between Garage columns.

b. Live Load: span/360 maximum, where the span is between Garage columns.

c. Earthquake Load: 1" (25 mm) maximum interstory drift between Garage levels.

d. Wind Load: span/175 and ¼" (6 mm) maximum, where the span is between Armature supports.

e. Temperature variation: 1/8" (3 mm) maximum movement between Armature supports.

L. Glass manufacturer to submit QA/QC procedures and efforts to minimize anisotropy ahead of production. See section 2.02.F.3. of this specification.

M. Product Data:

1. Manufacturer's data sheets on each product to be used.
2. Provide test reports indicating products meet or exceed specified requirements.
3. Preparation instructions and recommendations.
4. Storage and handling requirements and recommendations.
5. Typical installation methods.

N. Shop Drawings: Prepare shop drawings in a professional manner by a person experienced in this type of drafting and submit in accordance with this Specification. 'Mark-ups' and 'overnotes' on the Contract Documents drawings will not be accepted as Shop Drawings. Shop drawings shall clearly indicate materials and methods, indicate coordination with other trades and bear signed approval of the Artwork Glass manufacturer. Drawings should include all supporting structures.

O. Shop drawings shall be submitted in .pdf format via electronic means that are fully referenced to marking plans and elevations and reviewable as an independent package. Drawing quality and density shall be clear, legible and to scale. A maximum of two reviews of each drawing have been allowed for. Unless indicated otherwise in the Contract Documents, provide the following information on the title block:

1. project identification.
2. the Artwork Glass Fabrication Sub-Contractor's name.
3. date of preparation of submission, and of revision where applicable, issue status.
4. shop drawing number and title of item to which the shop drawing refers.
5. relevant Drawing numbers and Specification clauses.
6. names of person or firm preparing shop drawings, if different from the Artwork Glass Fabrication Sub-Contractor.
7. the Artwork Glass Fabrication Sub-Contractor's statement or stamp on each shop drawing, verifying that it has examined and approved.

P. Shop Drawings shall be issued for both Design-in-Principle and Full documentation as outlined below:
   1. Design-in-Principle Documentation: Prepare shop drawings to demonstrate the typical systems and interfaces prior to the preparation of full shop drawings.
   2. Full Documentation: Once the design-in-principle drawings have been reviewed and modified as deemed necessary by all parties, prepare clear and complete details of each assembly, component and connection together with all information relative to their fabrication, material, surface treatment and packaging for shipment and storage on site.
   3. Submissions shall be complete for the area of work including all relevant cross-referenced plans, elevations, details and calculations (if calculations are required).

Q. The shop drawings shall include, but not be limited to:
   1. Marking plans, elevations and sections showing the location of and marking proposed for each element, including any secondary support system.
   2. Sectional details of all typical and non-typical elements and associated elements including interfaces with adjacent work.
   3. Surrounding structure and relevant conditions.
   4. Details of materials, construction, finish, fastener locations, Artwork Glass, Point Supported Glass Hardware and fixings arrangements and relationship with adjacent construction.
   5. Schedule identifying each unit, with marks or numbers referencing Drawings.
   6. Method of fabrication.
   7. Material type, grade etc. (typically provided on the General Notes drawing).
   8. Identification of type and extent of protective coating to be applied.
   9. Show dimensions, tolerances, profiles, product components, and accessories.
   10. Dimensions for fabricating individual components.
   11. Location and representation of safety marking.

R. Where shop drawings, prepared by other (sub)-contractors or suppliers, indicate site dimensions which have not been taken, the Artwork Glass Fabrication Sub-Contractor shall take such site dimensions before submitting shop drawings, and enter them on all copies of the shop drawings. Where dimensions are given and marked 'verify' or 'verify on site', the Artwork Glass Fabrication Sub-Contractor shall verify dimensions and indicate that they are verified (or corrected) before submitting shop drawings. Where site conditions do not yet exist for taking or

confirming of site dimensions, the Artwork Glass Fabrication Sub-Contractor shall note shop drawings with 'dimensions will be verified on site' before submitting.

S. Do not commence fabrication until the shop drawings have been reviewed and permission to proceed has been obtained from SFAC. If materials are required to be ordered or fabricated by the Artwork Glass Fabrication Sub-Contractor in order to maintain the Construction schedule, prior to the issue of 'For Construction' shop drawings, the Artwork Glass Fabrication Sub-Contractor shall obtain the approval from SFAC.

T. Keep current, approved copies of shop drawings on site.

U. Verification Samples: Coordinate with the Artist to determine samples. Coordinate with the Point Supported Glass Installation Sub-Contractor to supply the Point Supported Glass Hardware and together make sample assemblies. As a minimum, verification samples required shall include:

1. Full-scale glass test panel demonstrating color, translucency, and finish for Artist and SFAC approval.
2. Four (4) 12" x 12" samples of Artwork Glass with Point Supported Glass Hardware (glass attachment and spider fittings) assembled with glass, bolts and accessories.
3. One small-format sample panel or frit test tile shall be retained by SFAC for archival reference.

V. Submit digital proofs of printed artwork imagery showing color calibration data (ICC profile).

W. Submit high-resolution photographs documenting approved samples for SFAC archive.

X. Mock-Ups: See section 1.08.F. of this specification.

Y. Maintenance Manuals: Manufacturer's maintenance manuals.

Z. Warranty: Manufacturer's warranties as described in section 1.11.

AA. Closeout Submittals: At completion, submit to SFAC:

1. Final as-built drawings.
2. Digital production files (editable format).
3. Maintenance instructions.
4. Photographic documentation of each panel prior to crating.
5. Completed and executed certificates of compliance.

1.08 QUALITY ASSURANCE

A. Pre-installation Conference and Inspection: After approval of submittals, but prior to beginning fabrication of the Works of this specification, the Artwork Glass Fabrication Sub-Contractor shall attend a meeting at the site attended by representatives of Owner, Architect, Main Building Contractor, Armature structural steel fabricator and erector, and the Artwork Glass Installation Sub-Contractor to describe in detail the Point Supported Glass system to be installed, to establish agreement, coordination and responsibilities among involved trades, and review the Artwork installation procedure and schedule including the methods of delivering and handling glass and installing the Point Supported Glass. The chemical compatibility of all glass materials and framing materials, including sealants if required, with each other and with like materials used in glass fabrication shall be established. The Artwork Glass Fabrication Sub-Contractor, if based outside of California or in another country, may attend this meeting remotely by videoconference.

B. The Fabricator shall submit a written Quality Control Plan describing in-process inspection methods for enamel application, color accuracy, lamination quality, and glass edge finishing. Notify SFAC at 25%, 50%, and 75% completion for optional review checkpoints.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum ten (10) years documented experience in fabrication and shipping of glass structures for projects of similar scope.

1. Minimum 10 years experience in the manufacture and fabrication of laminated glass.
2. Manufacturer must use a point supported glass system comprised of domestically produced hardware that is fabricated and assembled in the USA.
3. Manufacturer must be recognized by NAMI.
4. Manufacturer must be a member in good standing of the National Glass Association (NGA).

D. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

E. Quality Standards: In addition to Code, provide the Works of this Section so designed that glass installation, by Artwork Glass Installation Sub-Contractor, shall conform with ANSI Z97.1 and Federal Safety Standard 16 CFR 1201 for Category II materials.

F. Mock-Up: The Artwork Glass Installation Sub-Contractor shall construct a mock-up with actual materials in sufficient time for the Artist's review and to not delay construction progress. to Supply the glass panels and coordinate with the Artwork Glass Installation Sub-Contractor for the supply of the Point Supported Glass Hardware for the mock-up. These panels shall be selected to represent the final installation in terms of attachment of glass to support structure.

1. Intent of mock-up is to demonstrate surface preparation techniques, quality of workmanship and visual appearance.
2. The mock-up will be standalone and will not be included in the completed Artwork.
3. Provide Artwork Glass for a full-scale mock-up (min 4 × 4 ft) representing imagery, color, and finish for SFAC and Artist approval prior to production.
4. Do not continue with remaining work until workmanship, color, and sheen are approved by Artist.
5. If mock-up is not acceptable, the Artwork Glass Installation Sub-Contractor shall rebuild the mock-up until satisfactory results are achieved.
6. Upon project closeout, mock-up panel to be delivered to SFAC Collections for archival storage.
7. A total of four (4) Artwork glass panels shall be installed on the as-built support structure as part of a second mock-up.

G. All tempered glass shall have a permanent mark with the origin and type of the glass. The marking shall be discreetly located in a position visible in the final construction and consistent throughout the assembly.

H. All laminated glass shall have a safety stamp (bug) certifying safety and durability.

1.09 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer’s instruction for shipping, delivering and protecting the Point Supported Glass.

B. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Follow manufacturer’s recommendations to maintain environmental conditions (temperature, humidity, and ventilation) within limits for optimum results and manufacturer’s recommendations for the limits of environmental conditions for shipping and storage of products.

D. Exercise exceptional care to prevent edge damage to glass and damage/deterioration to coating on glass.

1.10 PROJECT / SITE CONDITIONS

A. Field Measurements: When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products.

1.11 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty against defects in materials and workmanship commencing at Substantial Completion and transfer of ownership to the City and County of San Francisco.

1. Laminated Glass: Provide a twelve (12) year warranty to include coverage for delamination, including replacement of failed units.

2. Tempered Glass: Provide a five (5) year warranty to include labor and material to replace any glass that spontaneously breaks due to nickel sulfide inclusions.

3. Provide a twelve (12) year warranty to include labor and materials for coated glass to replace unit deterioration including peeling, cracking, color fade, enamel failure and other indications of deterioration or corrosion in glass coatings.

B. Provide manufacturers certificates that all of the Works are in accord with approved shop drawings and specifications and are free from defects in materials and workmanship.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer is used in this section to refer to a firm that produces primary glass or fabricated glass and Point Supported Glass Hardware as defined in the referenced standards.

B. Acceptable Glass Manufacturer: Glassmalerei Peters Studio (Peters).

C. Acceptable Point Supported Glass Hardware Manufacturer and Supplier: C.R. Laurence Co., Inc. (CRL).

D. Substitutions: only as approved by the Artist and the SEOR. Substitutions require written approval by the Artist and SFAC Public Art Project Manager prior to submission to the SEOR.

2.02 MATERIALS

A. All glass must be ultra- clear (low iron) laminated glass with two plies of fully tempered (FT) float glass and structural interlayer laminated glass. Laminated glass is to be produced using laid-in place interlayer bonded via an autoclave heat and pressure process with vacuum bag. Minimum interlayer thickness is to be 0.060". (Poured or cast resin laminates will not be permitted.)

B. All glass units shall be manufactured as follows with dimensions, size and center points of holes for point supports located as per Contract Documents:

1. Outer lite: 5/16" (8 mm) fully tempered (FT) low iron glass with decorative enamel on face #2:

2. Interlayer: 0.060” (1.52 mm) sentryglas ionoplast interlayer, laminated in vacuum-bag process.
3. Inner lite: 5/16" (8 mm) fully tempered (FT) low iron glass.

C. The Artwork Glass will include Artist-designed graphics integrated into the glass panels with colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.

D. Ultra-Clear (Low Iron) Float Glass:

1. ASTM C1036, Type I, Quality-Q3, Class I or equivalent to EN 572 with visible light transmission not less than 91 percent for 1/4 inch (6mm) thick monolithic glass.
2. In order to reduce the possibility of glass color range rejection, the supplier of ultra-clear glass products shall provide glass for the entire project from a single facility using stockpiled batch run materials from a single source for the entire project.
3. Float Glass quality imperfection limitations: In addition to the limitations included under ASTM C1036, all Glass shall be supplied meeting the following quality standards:
    a. Point Blemishes - Seeds/ Stones with distortion, Stain Spots, Dirt, Surface Damage shall be limited to 0.06 inch (1.5 mm) maximum separated by ≥ 12 inch (300 mm).
    b. Glass Scratch / Rubs shall be rejected if detectable at 10 ft (3050 mm).
    c. Water blow off stains, tag residue, and handprints will not be permitted.
4. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    a. Saint Gobain; Diamant.
    b. AGC/Interpane; Planibel Clearvision.
    c. Vitro Architectural Glass; Starphire.
    d. Guardian Industries Corp.; UltraClear.
    e. Pilkington; Optiwhite.

E. Cutting, Edgeworking and holes:

1. All perimeter glass edges to be mirror polished as agreed with Artist through samples.
2. Glass holes shall be fabricated in accordance with the guidelines established in ASTM C1048 for Heat Treated Flat Glass.
    a. Glass holes to have seamed edges at a minimum and comply with glass fitting manufacturer’s requirements.
    b. The edge quality of drilled holes shall be ground and at least equal to a seamed edge.
    c. Raw water-jet cut hole edges are not allowed.
3. All edgework, holes and notches in the tempered glass panels shall be completed before tempering.
4. Coordinate with Artist to determine edge profile.

F. Fully Tempered Type (reference ASTM C1048, Kind FT):

1. Heat treat by horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. Glass manufacturer shall control heating and cooling of glass to be as homogeneous as possible.
3. Glass manufacturer to submit QA/QC procedures and efforts to minimize anisotropy ahead of production. Acceptability of level of anisotropy to be established and verified as a baseline standard at the time of VMU/PMU at the sole discretion of the SEOR.
4. Fully tempered (FT) glass shall have a residual surface compression not less than 10,000 psi (69 MPa) or edge compression not less than 9,7000 psi (67 MPa) as defined in ASTM specification C1048.
5. Approximate maximum allowable edge stress (allowable) for glass lites associated with a maximum probability of breakage (P_b) less than or equal to 0.008 for a 3-s load duration for tempered glass is 10,600 psi (73.0 MPa).

G. Fully Tempered Safety Glass shall comply with ANSI Z97.1 and CPSC 16 CFT 1201 fabrication tolerances criteria:
1. Edge Dimensions and Squareness: ASTM C 1036 and ASTM C1048.
2. Diagonal/Squareness: ASTM C1036 and ASTM C1048.
3. Warp Tolerance: Rectangular glass to be 1/32 inch (0.8mm) over any 12 inches (305mm) but limited to 5/16 inches.
4. Wave Distortion Tolerance for lites 5/16 inch thick and more: Not to exceed 0.003 inches (0.076mm) from peak to valley in the center of lites, and a maximum of 0.006 inches (0.15mm) within 10.5 inch (267mm) of the leading or trailing edge.
5. Millidiopter: 90 percent of surface not to exceed plus or minus 120 millidiopters.
6. General warp and bow: Not to exceed 0.2% of edge length.

H. Heat-Soak Testing: All tempered glass to be heat soak tested with a minimum holding time at 500deg F glass temperature of 2 hours. Heat soak process shall comply with EN 14179.
1. Tempered (toughened) glass shall be free from Nickel Sulphide inclusions.
2. After the heat-soak testing, the probability of failure in service should be less than one in 130 tonnes, or 5,000m^2 of 8 mm tempered glass.
3. Glass identification: All glass shall be marked prior to heat soaking (HST Check marker or stamp by Boraident) to allow HST to be confirmed for each individual lite.
4. Record and submit breakage rates in heat soaking oven for information.
5. Provide certification for the heat soaking process.

I. Laminated Glass: Float glass laminated in accordance with ASTM C1172:
1. Laminated Safety Glass: Comply with Class A of ANSI Z97.1 or 16 CFR 1201 test requirements for Category II.
2. Unless permitted by the Artist, use only interlayers which have been proven by test to demonstrate the specified quality, performance and durability when the adhered glass surfaces carry the frit type, color, pattern and density described by the Artist.
3. Store interlayer material dry and control moisture content for every batch.
4. Where the edge of laminated glass is to be exposed, the interlayer material must be shown to be resistant to the effects of moisture absorption, including clouding and delamination.

5. No hazing or clouding due to improper fabrication of the laminate layers is permitted.
6. Use ionoplast-type interlayer such as SentryGlas (SGP) where specified or where laminated glass edges will be exposed to direct wetting or elevated relative humidity conditions greater than 60% RH.
7. Use Vacuum-Bag method for lamination.
8. Do not splice interlayer material.
9. Clean glass immediately before lamination, using an automated washing process or carry out 100% visual inspection if glass is cleaned manually.
    a. Carry out regular testing of glass cleanliness prior to lamination and keep records of water quality and visual inspections for every batch.
10. Laminate units in autoclave and follow Interlayer supplier's instructions for:
    a. Autoclave settings for pressure, temperature and time.
    b. Vacuum bag pressure and pre-vacuum times.
    c. De-airing procedure.
    d. Glass flatness and glass condition.
11. Limit permanent deformation of the glass during lamination such that debonding stress is limited to 1/100 of the bond strength of the laminate to prevent delamination along the glass perimeter.
12. Laminate with excess interlayer along edges and hot-knife cut interlayer flush with surface of glass edge after lamination. There shall be no recessed interlayer at the top glass edge.

J. Ceramic-Coated Glass.

1. Heat treated lites to comply with ASTM C1048, Condition C and specified requirements for heat treated float Glass.
2. Ceramic enamel applied by digital print or silk-screened processes complying with Specification No. 95-1-31 in GANA's Tempering Division's "Engineering Standards Manual" and with other requirements specified.
3. Ceramic Coating Color and Pattern as defined by Artist.
4. Verify compatibility of frit with Interlayers.
5. Enamel pigments and interlayers shall be UV-stable and non-yellowing under direct sun exposure for minimum 12 years in marine environment.

K. Finishes

1. All exposed surfaces will be free of scratches and other serious blemishes.
2. Surface finish and gloss level shall match approved mock-up panel.

L. Fittings (Point Supported Glass Hardware procured by Point Supported Glass Installation Sub-Contractor)

1. "Spider" type attachment fittings for walls are predominately manufactured from Stainless Steel Grade 316.
2. The finish of all fittings shall be brushed stainless.
3. Glass attachments by CRL shall be HSF14BS Swivel Head Cap Mount with the following spider fittings:

a. FMH2BS double arm for:

1. Vertical edges (two points).
2. Intermediate middle points (for 6 points supported glass panels).

b. FMH1BS single arm (one point) for:

3. Top & bottom corners.
4. Vertical edges at the double horizontal tubes (separation joint at the Armature HSS vertical post splices).
5. Middle points (for 6 points supported glass panels) at top and bottom edges.
6. Middle points (for 6 points supported glass panels) at the double horizontal tubes (separation joint at the Armature HSS vertical post splices).

c. FMH4BS four arm “V” for:

7. Typical four glass panel connections (four points).

d. FMH2VBS double arm “V” for:

8. Single-double arm (two points) for the top & bottom edges and for the intermediate (two points) at the double horizontal tubes (separation joint at the Armature HSS vertical post splices).

4. Point Supported Glass Hardware shall meet the requirements of the Contract Documents. Any proposed substitutions for the Point Supported Glass Hardware shall be approved by the SEOR and shall be shown by the Artwork Glass Fabrication Sub-Contractor to be in compliance with this specification in all respects and shall be demonstrated by calculation and tests that the stresses induced in the glass by these fittings are compatible with the strength of the glass.
5. Point Supported Glass Hardware shall provide a tolerance capability that will cope with the full range of movements shown in the Contract Documents:
    a. Thermal movements occurring as a result of differential coefficients of thermal expansion within the range specified. The components used within the system will noiselessly withstand all thermal movements without any buckling, distortion, cracking, failure of joint seals or undue stress on the glass or fixing assemblies.
    b. Deflection of the Armature due to loading applied after the erection of the Point Supported Glass system to the magnitude specified.
    c. Maximum side sway of the structure due to wind load and/or seismic occurring to the magnitude specified or seismic movement to the degree specified.
    d. Deflection due to self-weight of the Point Supported Glass system.
    e. Inward and outward movements due to the design wind loads and/or seismic loads specified.
6. Point Supported Glass Hardware to be reviewed by the Artwork Glass Fabrication Sub-Contractor including compatibility with glass fabrication and allowances for tolerances. The Artwork Glass Fabrication Sub-Contractor shall provide written confirmation that the Point

Supported Glass Hardware, procured by the Artwork Glass Installation Sub-Contractor, is compatible with the Artwork Glass.

7. Point Supported Glass Hardware (caps, ball joints, bolts, washers, articulated swivel bolts, etc.) shall be machine finished stainless steel grade 316, or conventional glass attachment system assemblies.
8. Bushings will be UV-resistant nylon.
9. Gaskets will be fully vulcanized fiber, neoprene or pre-cured silicone.
10. All fittings and fasteners to be stainless steel grade 316 unless noted otherwise.

2.03 FABRICATION

A. Fabrication methods shall maintain visual fidelity to approved samples and avoid any process that alters color tone or transparency of the Artist's imagery.

B. Fabricate components in accordance with approved Shop Drawings.

C. Major fabrication must done at the manufacturing location.

D. Manufacturer is to be notified of any field modification prior to the activity commencing.

E. Fabricate components true to detail and free from defects impairing appearance, strength or durability.

F. Cut glass clean and carefully. Nicks and damaged edges will not be accepted. Replace glass with damaged edges.

2.04 GLASS TESTING

A. Subject to approval by SFAC and the SEOR, test reports from a recognized laboratory may be acceptable in lieu of testing for some elements.

B. The method of testing is to be submitted and agreed with SFAC prior to commencement of testing.

C. As a minimum, all load tests should include:

1. Inspect each sample make record of all chips and spalls along all edges of the test specimens.
2. Provide record of surface compression of each sample (tin side) checked using Grazing Angle Surface Polarimeter (GASP) prior to testing. Surface stress measurements are to map local stress changes accounting for the effects of corners and holes.
3. For all full sized specimens, surface stress measurements are to be recorded at regular loadings throughout the test.
4. Load and deflection during each test are to be monitored and recorded.
5. The performance of the glass attachment fittings is to be monitored throughout each test.

D. Test to ASTM C158 or EN 1288-3 for bending (flexure) strength:

1. As a minimum, test three samples of the largest 6 point supported glass panels.
2. The composition (glass thickness, glass type, laminate, frit, etc.) of the test samples is to be the same as proposed for the final product.
3. Each of the glass panel test samples is to be supported by the same Point Supported Glass Hardware as proposed for the final product positioned with edge distance as per the

Contract Documents. Coordinate with the Artwork Glass Installation Sub-Contractor for the supply of the Point Supported Glass Hardware for the bending tests.

4. Test to failure with uniform load applied normal to the glass surface incrementally increasing the uniformly distributed load on the glass from zero load to working, then to 1.5 times working and finally to failure of the glass or the glass attachments. Configure the test specimens and loads so that the maximum stress produced by this loading is at the middle edge point fixing holes.
5. Alternative bending test configuration and methods may be proposed by the Artwork Glass Fabrication Sub-Contractor for approval by the SEOR.

E. The test results are to be presented in a report to SFAC prior to commencement of fabrication.

F. During production, provide Surface and Edge Compression examinations per ASTM C1048 and ASTM C1279:

1. Examine specimens by the polariscopic or light refraction methods for surface or edge compression.
2. Test the first Glass Lite of every run, at the start of each production shift, whenever tempering furnace settings are altered and the first Glass Lite of machine operator changes.
3. Surface stress results recorded for the test specimens are to be used as quality control levels for production.

PART 3 - EXECUTION

3.01 APPROVAL TO PROCEED

A. Do not proceed with the Artwork Glass fabrication until receiving written approval relating to the shop drawings, relevant performance test report(s) and the shop and on-site quality control procedures. The approval will be accompanied by a written statement that SFAC has reviewed and accepted the test performance. Written approval from SFAC is required prior to Notice to Proceed with fabrication.

3.02 PREPARATION

A. Protect glass and equipment from damage caused by work of this Section.

B. The chemical compatibility of all materials and framing with each other and with like materials used in glass fabrication shall be established.

C. Notify the Artist in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.03 DELIVERY, STORAGE, AND HANDLING

A. The Fabricator shall store and transport Artwork Glass with extreme care in strict accordance with the requirements of SFAC.

B. Inspect each unit of glass before shipping. Glass that has significant impact damage at edges, scratches, abrasion of faces or any other evidence of damage will not be accepted.

3.04 CLEANING

A. Clean and protect products in accordance with the manufacturer's recommendations.

B. Glass to be cleaned according to:

1. GANA Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
2. GANA Glass Information Bulletin GANA TD-02-0402 – Heat-Treated Glass Surfaces Are Different.

C. Use only neutral-pH cleaners; ammonia, abrasive, and acidic products are prohibited.

D. Do not use scrapers or other metal tools to clean glass.

3.05 COMPLETION

A. Certification: At the completion of the work, and as a precondition to final payment, submit completed and executed certificates of compliance.

B. Operations and Maintenance Manual: Collaborate with the Artwork Glass Installation Sub-Contractor to develop and submit for approval a strategy in the form of a maintenance manual and log book to ensure that elements likely to deteriorate significantly can be replaced or rectified. Identify maintenance in terms of routine (e.g. cleaning) and in terms of component repair/replacement. Analyze each system to define the sequence under which components are likely to fail. The maintenance manual procedures shall be submitted to SFAC for the satisfactory long-term care and regular maintenance of the Artwork (and associated works), including:

1. Data reference sheets and a general description of the system, which shall identify all elements incorporated in the Artwork, list all items supplied and installed, provide a reference to appropriate drawings and trade literature included and identify different areas served by the system.
2. A detailed description of specific items with product names, types, serial numbers, etc.
3. The name, address and telephone number of each firm and / or Contractor involved in the supply or fabrication of materials, components, assemblies and finishes.
4. Schedule for future inspection and testing of the Artwork, which shall set out the procedures to be followed for future inspection, testing and planned preventative maintenance procedures together with a suggested time program.
5. A method statement showing the means of access to all parts of the Artwork with recommended safe loadings.
6. Copies of manufacturers' warranties, service manuals, brochures, recommendations, etc.
7. Copies of test and approval certificates,
8. A list of replacement parts recommended to be held on site, with the names of suppliers.
9. Realignment and adjustment instructions where relevant.
10. Procedures for dismantling and reassembling.
11. Finishes and their architectural description.
12. Cleaning and general maintenance instructions, which shall provide complete details of all cleaning and general maintenance requirements for the Artwork.

C. Include in the Manual a Logbook, with pages set up for recording the times of performance of the above procedures, sufficient in number to receive the entries for three years. Show examples of typical entries by recording any maintenance procedures (such as cleaning) performed during the contract and defects liability periods. The Manual and Logbook shall be 8.5 x 11 size, printed or typed on durable printing paper, each page consecutively numbered, neatly bound in durable

vinyl or similar hard covers, and permanently labelled with the project name and date of issue. Supply any word processing files in Adobe Acrobat PDF format on a flash drive.

D. Record Drawings: Progressively produce and maintain 'as-fabricated' drawings to accurately record fabrication of the Artwork Glass. Record drawings shall include revisions to the Artwork Glass. Such drawings shall be available for inspection and checking by SFAC from time to time. Obtain approval on the form of presentation of record drawings before preparing final drawings. Unless other requirements are specified or given in writing by SFAC, record drawings shall consist of:

   1. Legible and high quality black and white drawings on a reproducible medium (plain paper photocopy), and.

   2. One flash drive, containing a copy of each shop drawing, 'AS BUILT DRAWING', and the like relevant to the installation, in .pdf or .dwg format.

E. Final digital production files of artwork imagery shall be submitted in editable archival format (PSD or TIFF) to SFAC for preservation in the Civic Art Collection.

F. Spares: At or before practical completion, deliver spares as required by SFAC to site in strong, waterproof protective packages marked for identification, and store where directed. One small-scale sample glass panel representing final artwork color and finish shall be delivered to SFAC Collections for archival use.

END OF SECTION

SAN FRANCISCO ARTS COMMISSION
ARTWORK TECHNICAL SPECIFICATIONS
WALTER KITUNDU | *THOSE WHO CARRY WATER*
SAN FRANCISCO WATER DEPARTMENT AT 2000 MARIN

Specification: ARTWORK POINT SUPPORTED STRUCTURAL GLASS INSTALLATION

PART 1 - GENERAL

1.01 STYLE AND NATURE OF THIS SPECIFICATION

This document is written in the directive style. Where an obligation is given and it is not stated who is to undertake these obligations, it is to be undertaken by the Artwork Glass Installation Sub-Contractor (Installer).

This document shall be read as a whole. No one section should be isolated or read to be all inclusive of any information related to the topic of that section.

This Specification forms part of the Contract Documents of a supply and installation package. This Specification together with the Drawings define the Scope of Work, mandatory geometry of the Artwork, performance parameters for the Point Supported Glass and Point Supported Glass Hardware, minimum acceptable standards and establishes a regime for verification of the receipt and installation of glass processes and Point Supported Glass Hardware procurement.

This specification governs the installation of an artist-designed artwork (Those Who Carry Water by Walter Kitundu). While structural and performance requirements are as established by the Engineer of Record, installation shall also preserve the Artist's approved visual intent and the aesthetic integrity of the artwork.

1.02 CLARIFICATION OF GLASS FABRICATION AND GLASS INSTALLATION SUB-CONTRACTOR ROLES

Fabrication of the glass and installation are procured separately. The receipt and installation of the Artwork Glass and the procurement of the Point Supported Glass Hardware is a separate and independent contract under the General Contractor that includes these specifications for the Artwork Glass Installation Sub-Contractor (Installer).

The fabrication, shipping and delivery of the Artwork Glass by the Artwork Glass Fabrication Sub-Contractor (Fabricator) is under a separate and independent contract that does not include these specifications.

It is assumed that the Installer and Fabricator may not be the same entity. The Artwork Glass Installation Sub-Contractor (Installer) shall fully review the ARTWORK POINT SUPPORTED STRUCTURAL GLASS FABRICATION specifications and confirm their understanding of the ARTWORK POINT SUPPORTED STRUCTURAL GLASS FABRICATION specifications in writing to the General Contractor. The Installer and the Fabricator shall coordinate their respective scopes. The Installer shall notify the General Contractor of any comments concerning their scope and coordination of their scope with the Fabricator.

The Artwork Glass Installation Sub-Contractor shall procure the glass hardware, be responsible for the handling (receipt and storage) of the Artwork Glass, and be responsible for the erection of the Artwork including coordination with the supporting building structure to fully comply with the Contract Documents' requirements and the Artist's intent.

The Artwork Glass Fabrication Sub-Contractor shall procure the Artwork Glass and be responsible for the shipping and delivery of the Artwork Glass including coordination with the supporting building structure to fully comply with the Contract Documents' requirements and the Artist's intent.

The Installer should coordinate with the San Francisco Arts Commission (SFAC) Public Art Project Manager regarding all activities that affect the visual alignment and finish of the artwork. Artist and SFAC review should occur at the mock-up stage, first-piece installation, and substantial completion.

1.03 SUMMARY

A. This section relates to the Artwork installation, the procurement of the Point Supported Glass Hardware, and Artwork Glass handling (receipt and storage).

B. The Artwork Glass Installation Sub-Contractor (Installer) scope shall include, but not necessarily be limited to, Artwork Glass handling (receipt and storage), procurement of the Point Supported Glass Hardware, Artwork installation, and attachments to the Armature.

C. The Artwork Glass Installation Sub-Contractor (Installer) scope shall also include, but not necessarily be limited to, coordination with the Artwork Glass Fabrication Sub-Contractor (Fabricator), coordination with the Armature fabrication and installation, and coordination with the supporting building structure.

D. The scope includes Artwork Glass for the Point Supported Glass System including all labor, materials, installation engineering, equipment and services necessary to complete the Artwork as shown on the Contract Documents, including, but not limited to, the following:

1. Procurement of the Point Supported Glass Hardware, and attachments to the Armature.
2. Glass handling (receipt and storage).
3. Coordination with steel Armature.
4. Coordination with the Fabricator for tolerances, the Point Supported Glass Hardware, shipping and delivery, handling, erection sequences and attachments to the Armature.
5. Erection by an installer approved by the Artist and SEOR.
6. Construct mock-up.
7. Include layout and measurement to achieve and verify visual alignment and consistent joint spacing across all installed glass panels.

E. Related Sections

1. Drawings, General and Supplementary Conditions of the Contract, Division 1 and the following Specification Sections, apply to this Section.
2. ARTWORK POINT SUPPORTED STRUCTURAL GLASS FABRICATION Specification.
3. SAN FRANCISCO ARTS COMMISSION ARTWORK COORDINATION RFP.
4. Applicable and relevant 2000 Marin project specifications.

1.04 REFERENCES

A. The Installer is responsible to adhere to the following references pertaining to Artwork Glass handling (receipt and storage), procurement of the Point Supported Glass Hardware, Artwork installation, and attachments to the Armature.
B. ARTWORK POINT SUPPORTED STRUCTURAL GLASS FABRICATION specification.
C. SAN FRANCISCO ARTS COMMISSION ARTWORK COORDINATION RFP.
D. The most current version of the codes and standards shall be used.
E. American Architectural Manufacturer's Association:

1. AAMA 501 – Methods of Tests for Exterior Walls.
2. AAMA TIR-A9 - Design Guide for Metal Cladding Fasteners

F. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

G. ASTM International (ASTM):

1. ASTM A743 - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
2. ASTM C158 - Standard Test Methods for Strength of Glass by Flexure (Determination of Modulus of Rupture).
3. ASTM C162 - Standard Terminology of Glass and Glass Products.
4. ASTM C1036 - Standard Specification for Flat Glass.
5. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
6. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
7. ASTM C1279 - Standard Test Method for Non-Destructive Photoelastic Measurement of Edge and Surface Stresses in Annealed, Heat-Strengthened, and Fully Tempered Flat Glass.
8. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
9. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
10. ASTM E1300 Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load.
11. ASTM F738 Standard Specification for Stainless Steel Metric Bolts, Screws, and Studs.

H. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

I. Consumer Product Safety Commission CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

J. European Standards (EN):

1. EN 572 – Glass in Building – Basic Soda Lime Silicate Glass Products.
2. EN 1288-3 – Glass in building — Determination of the bending strength of glass - Part 3 - Test with specimen supported at two points (four point bending).
3. EN 12150 Glass in building - Thermally toughened soda lime silicate safety glass.
4. EN 12543 – Glass in Building – Laminated Glass and Laminated Safety Glass.

K. Fenestration and Glazing Industry Alliance (FGIA).

L. Glass Association of North America (GANA): Glazing manual.

M. Glass Association of North America (GANA): Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.

N. Glass Association of North America (GANA): Glass Information Bulletin GANA TD-02-0402 – Heat-Treated Glass Surfaces Are Different.

O. National Accreditation and Management Institute, Inc. (NAMI).

P. National Glass Association (NGA).

DEFINITIONS

A. Annealed Glass: Glass in its unprocessed form without internal stresses caused by heat treatment, such as rapid cooling, or by toughening or heat strengthening.

B. Armature: Structural steel framing and connections to reinforced concrete Garage structure to support the Artwork.

C. Artist: A person that designs and fabricates the Artwork, under the supervision of the San Francisco Arts Commission.

D. Artwork: Vertical Point Supported Glass and Point Supported Glass Hardware with Artist-designed graphics integrated into architectural glass panels installed on the façade of the Infrastructure Facility employee Garage. The Artwork will include colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.

E. Artwork Glass: Vertical Point Supported Glass with Artist-designed graphics integrated into architectural glass panels installed on the façade of the Infrastructure Facility employee Garage. The Artwork Glass will include colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.

F. Artwork Glass Fabrication (Fabrication): Includes the procurement, shipping and delivery of the Artwork Glass including coordination with the Artwork Glass Installation Sub-Contractor (Installer) and coordination with the Armature and supporting building structure

G. Artwork Glass Fabrication Sub-Contractor (Fabricator): Sub-Contractor responsible for the procurement, shipping and delivery of the Artwork Glass including coordination with the Artwork Glass Installation Sub-Contractor (Installer) and coordination with the Armature and supporting building structure.

H. Artwork Glass Installation (Installation): Includes Artwork Glass handling (receipt and storage), procurement of the Point Supported Glass Hardware, Artwork installation, and attachments to the Armature including coordination with the Artwork Glass Fabrication Sub-Contractor (Fabricator) and coordination with the supporting building structure

I. Artwork Glass Installation Sub-Contractor (Installer): Sub-Contractor responsible for the procurement of the glass hardware, handling (receipt and storage), and erection of the Artwork including coordination with the Artwork Glass Fabrication Sub-Contractor (Fabricator) and the coordination with the supporting building structure.

J. Artwork Review Sample: Full-scale glass test panel demonstrating color, translucency, and finish for Artist and SFAC approval.

K. City Representative: A person overseeing construction activity for the City and County of San Francisco.

L. Client: Otherwise known as the project Owner, the client is the end purchaser of the works, who holds the main building contract with the main building contractor.

M. Contract: For the purposes of this specification, the term “Main Contract” can be taken to mean “subcontract” or “Artwork Subcontract”. Also Refer to Artwork Glass Installation Sub-Contractor.

N. Contract Documents: Drawings and specifications, drawing notes, and construction administration documents (RFI responses, submittals and submittal responses, and approved substitutions) that define the scope for the point supported glass and the point supported glass hardware.

O. Float Glass: A sheet of glass made by floating molten glass on a bed of molten metal. This gives the glass uniform thickness and very flat surfaces. Float glass is slowly cooled to produce annealed glass.

P. Fully Tempered Glass: Glass that has been heat-treated using the horizontal (roller hearth) method and complies with ASTM C1048, Type I, Class 1 (clear).

Q. Garage: Infrastructure Facility employee parking structure.

R. Glass Lite: Glass Lite: Individual glass element before lamination into glass panel.

S. Glass Panel: Laminated glass panel with integrated Artwork. For this specification, glass panel and glass unit are the same.

T. Heat Soaked Glass: Glass that has been tested using heat soaking. The heat soak test or heat soak process is used to minimize the risk of spontaneous breakage of tempered glass caused by nickel sulfide (NiS) inclusions.

U. Heat Strengthened Glass: Produced with surface and edge compression levels that are lower than fully tempered glass. Heat strengthened glass does not meet safety glazing requirements.

V. Infrastructure Facility: The new San Francisco Water Department campus at 2000 Marin Street, San Francisco, CA, 94124.

W. Laminated Glass: A type of safety glass that is made by bonding two or more layers of glass together with layers of polyvinyl butyral (PVB) or ionoplast (SentryGlas). This creates a single sheet of glass. When broken, the interlayer keeps glass layers bonded and prevents them from breaking apart. The added rigidity and stiffness of SentryGlas allows it to maintain its structural integrity even when fully broken.

X. Main Contract: The contract between the Client and the Artwork Glass Installation Sub-Contractor (or Main Building Contractor) for the entire project works defined by the scope of works detailed in this specification and the Contract Documents.

Y. Main Building Contractor: The contractor responsible for delivering the scope of work for the Garage structure and the Armature, in coordination with this specification. For this specification, Main Building Contractor and General Contractor are the same.

Z. Point Supported Glass: Structural Artwork Glass with corner and edge point fittings supported by the steel Armature that connects to the reinforced concrete Garage structure with laminated fully tempered (FT) glass continuously open gaps on all sides.

AA. Point Supported Glass Hardware: All the components (hardware) to capture the glass and to connect to the steel framing Armature including the spider fittings, glass attachments, gaskets, etc.

BB. Point Supported Glass System: Includes the Point Supported Glass, the Point Supported Glass Hardware and coordination with the connections to the Armature.

CC. Public Art Project Manager: The person that represents the San Francisco Arts Commission Public Art Program.

DD. Safety Glass: Glass that has been tempered or laminated and is less likely to cause injury due to its additional strength and break pattern.

EE. San Francisco Arts Commission (SFAC): The Charter-established City agency that has jurisdiction over all art belonging to the City and charged with the preservation and care of this Artwork.

FF. San Francisco Arts Commission Public Art Program: The department responsible for the commissioning of permanent public Artworks to be accessioned into the Civic Art Collection as required by the City's Art Enrichment Ordinance.

GG. SEOR: Structural Engineer of Record licensed in the State of California in responsible charge of the structural engineering content of the Contract Documents.

HH. SFAC Public Art Project Manager: City representative administering design intent, reviews, and acceptance for the Artwork.

II. Spider Fitting: 316 Grade stainless steel single, double, triple and four arm fittings used to attach glass panels to the supporting Armature.

JJ. Tempered Glass: A form of safety glass that has been heat-treated to have either a minimum surface compression of 10,000 psi or an edge compression not less than 9,700 psi in accordance with the requirements of ASTM C 1048.

KK. Toughened Glass: Alternative name for tempered glass, commonly used outside of North America. See tempered glass definition.

LL. Works: Entire Artwork scope and requirements including the Point Supported Glass, Point Supported Glass Hardware with all of the components to connect to the supporting Armature and coordination with the Armature.

1.05 SCOPE OF WORK

The Artwork consists of vertical Point Supported Glass with Point Supported Glass Hardware. The Artwork is comprised of multiple sections of variable widths distributed on the north, west, and south sides of the building. Each Artwork section is comprised of individual glass panels. The laminated glass panels have colored enamels digitally printed onto float glass designed by the Artist. Color will be fired to the glass to form a permanent bond. The scope for this specification includes the Artwork Glass.
Required coordination included in this specification scope are coordination with Artwork Glass Fabrication Sub-Contractor (Fabricator), coordination with all of the components to connect to the supporting Armature, and coordination with the supporting Armature. The supporting Armature is under a separate contract.

A. Artwork Glass Installation Sub-Contractor: The Artwork documentation prepared by Danziger Engineering Collaborative and Tipping show the design, requirements and construction details. The Artwork Glass Installation Sub-Contractor shall receive and store the Artwork Glass, procure (or fabricate) the Point Supported Glass hardware, assemble and erect a complete system, in accordance with the design intent of the Contract Documents securing all necessary permissions and agreements for the Works included in this specification including, but not limited to, the following:

1. Mock-ups, test samples, testing and test reports.
2. Interfaces with Artwork Glass and the Armature.
3. Review and verification of Artwork construction loads.
4. Point Supported Glass Hardware test reports and new Point Supported Glass Hardware tests, if required.
5. Procurement of the Point Supported Glass Hardware.
6. Assembly and installation of the Artwork, and all temporary works required.

B. The Client's approval of the Artwork Glass Installation Sub-Contractor's documents shall be limited to:

1. Confirmation of all basic design parameters.
2. The Artwork Glass Installation Sub-Contractor 's quality control program.
3. The visual effect.

C. The Artwork Glass Installation Sub-Contractor shall meet the requirements for interfacing with Artwork Glass and the Armature as outlined in the Contract Documents.

D. The Artwork Glass Installation Sub-Contractor shall provide all necessary fixing, bolts and the set out for fixings, for accurate installation into the Artwork Glass and supporting Armature. All fixings, fastenings, anchorages, lugs and the like shall be of an approved type. They shall transmit all imposed loads and stresses to ensure the rigidity of the assemblies. They shall be designed to accommodate generous on-site adjustment and thermal movement.

E. The Artwork Glass Installation Sub-Contractor shall be responsible for all means & methods of installation of the Point Supported Glass System.

1.06 PERFORMANCE REQUIREMENTS

A. The Installer is responsible to adhere to the following performance requirements pertaining to Artwork Glass handling (receipt and storage), procurement of the Point Supported Glass Hardware, Artwork installation, and attachments to the Armature. The Installer shall coordinate these performance requirements with the Artwork Glass Fabrication Sub-Contractor (Fabricator) and inform SFAC and the SEOR of any performance requirements that are not being met by either the Installer or the Fabricator.

B. Analysis: All requirements in this specification shall be analytically and mathematically proven for the Point Supported Glass Hardware, except for those requirements called for to be proven exclusively by physical testing methods.

C. The Point Supported Glass System, as erected, shall meet or exceed the following structural and weather resistance requirements.

1. 25 years with minimum maintenance (apart from regular cleaning).
2. Glass surfaces and Point Supported Glass Hardware shall allow for installation and maintenance loading applied by installers, window cleaners and associated equipment.

D. All Point Supported Glass Hardware elements shall be fabricated and installed such that effective maintenance and replacement of these elements can be carried out without damaging adjacent components.

E. The Point Supported Glass System shall be fabricated and installed to be able to accommodate temporary removal of individual glass panels during replacement.

F. Each of the glass panels is to be supported by spiders and glass attachments positioned with edge distance and corner distance as per Contract Documents.

G. Finished Tolerances:

1. Glass: ±1mm in plan.
2. Alignment between adjacent glass panels: ±1mm.

H. The Artwork Glass Installation Sub-Contractor shall be required to accommodate the building superstructure tolerances including the tolerances for the Armature and the Garage structure.

I. The Artwork Glass Installation Sub-Contractor shall allow for all movements and dimensional changes including long-term movements that may occur in the Garage, Armature and Artwork including thermal expansion and contraction. Use the worst combination of tolerances and construction inaccuracies as specified including the worst case position in any slotted hole provided. Allow for adjustments by small increments in all directions. Distribute dead loads accordingly if adjustments are to be made during erection.

J. The Point Supported Glass Hardware and all attachments to the Armature shall resist dead loads, live loads, wind loads and seismic loads and all building movements, individually and in combination. All fixings are to accommodate the worst combination of tolerances.

K. The Point Supported Glass Hardware attachments to the glass shall provide adequate restraint without constraining thermal expansion and thermal contraction of the glass. Reference 1/GLS1.1 for glass constraints and releases including glass support notes for performance requirements and Artwork Glass Installation Sub-Contractor requirements.

1.07 SUBMITTALS

A. Submit under provisions of Section 01 - Administrative Requirements.

B. Prior to commencement of fabrication, the Artwork Glass Installation Sub-Contractor shall obtain and submit to the General Contractor certification from the manufacturer of each material that the material is of the correct grade, strength, size, finish etc., and that all applied coatings, finishes and the like have been applied to the relevant standards and requirements specified herein.

C. The Artwork Glass Installation Sub-Contractor shall provide written confirmation that they have reviewed and understand the ARTWORK POINT SUPPORTED STRUCTURAL GLASS FABRICATION specifications.

D. The Artwork Glass Installation Sub-Contractor shall provide written confirmation that the procured Point Supported Glass Hardware meets the requirements of the specification and all associated codes and standards, in a form acceptable to the SEOR.

E. For the Point Supported Glass Hardware specified, provide structural calculations stamped by a Structural or Civil Engineer licensed in the state or country where they practice and are qualified to provide engineering documentation to verify the capacity and compatibility of the Glass Hardware.

F. Provide written confirmation that the Artwork Glass, procured by the Artwork Glass Fabrication Sub-Contractor is compatible with the Point Supported Glass Hardware.

G. Provide written confirmation that the Point Supported Glass Hardware attachments to the glass shall provide adequate restraint without constraining thermal expansion and thermal contraction of the glass. Describe method, with structural detail drawings, of releasing the glass thermal expansion and thermal contraction movements with the written confirmation.

H. The Artwork Glass Installation Sub-Contractor shall prepare a schedule of materials to be used on the project. Materials schedule shall be updated and submitted to the General Contractor.

I. Point Supported Glass Hardware Test Data: Submit test reports from an independent laboratory certifying that the Point Supported Glass Hardware proposed for use has been tested. The Point Supported Glass Hardware tested must be similar in type of materials and design shown on the Contract Documents utilizing attachments through holes in the glass.

J. Proposed Testing: Submit a report with descriptive narrative and diagrams for proposed tests to be performed, if tests are required to supplement the information from previous testing.

K. Previous Testing: Submit copies of test reports and valid certifications previously performed on proposed systems. Include statement of any differences between the proposed system and the tested systems for which previous tests and valid certifications are submitted. Provide evidence of structural performance testing that the Point Supported Glass Hardware proposed is comparable to the previously tested system considering the following project specific loads, environment, and performance requirements:

1. Service loads:

    a. Live load 5 psf (lbs/square foot) applied normal to the glass surface and 200 lbs point live load applied anywhere (construction, access and maintenance loads to be confirmed).

    b. Wind Load 35.3 psf (lbs/square foot) applied normal to the glass surface.

    c. Seismic Loads 180%g.

2. External Environment:

    a. Temperature Range Ambient: 0°C to 40°C.

    b. Surface Allowance: -5°C to 80°C.

    c. Structural Members: ±25°C from ambient at installation.

3. Structural performance as tested in accordance with ASTM E330, or other approved method, with no glass breakage or permanent damage to fasteners, anchors, hardware, or actuating mechanisms. All loads and thermal expansion forces for the in-service conditions with the following maximum deflections:

    a. Normal wall deflection not exceeding 1/175 of clear span for span lengths of 162 inches (4115 mm) or less and 1/240 plus 1/4 inch (6 mm) for others. Restrict deflection to 3/4 inch (19 mm) maximum for individual glass panels.

    b. Parallel to wall deflection not exceeding 75 percent of glass edge clearance. Deflection limited to L/360 or 1/8 inch (3 mm) maximum.

    c. Deflection of the entire assembly, including, but not limited to, glass, not to exceed 1-1/2 inches (38 mm).

    d. Acceptable evidence of these deflection limits for any proposed substitutions to the Contract Documents shall be by calculation submitted to the SEOR.

4. Supporting Structure Movements: The Artwork Point Supported Glass System shall accommodate movements of the supporting structure of the Garage and the Armature for the Artwork relating to the following loading conditions:

    a. Dead Load: span/240 maximum, where the span is between Garage columns.

    b. Live Load: span/360 maximum, where the span is between Garage columns.

    c. Earthquake Load: 1” (25 mm) maximum interstory drift between Garage levels.

    d. Temperature variation: 1/8” (3 mm) maximum movement between Armature supports.

L. Product Data:

1. Manufacturer's data sheets on each product to be used.
2. Provide test reports indicating products meet or exceed specified requirements.
3. Preparation instructions and recommendations.
4. Storage and handling requirements and recommendations.
5. Typical installation methods.

M. Shop Drawings: Prepare shop drawings in a professional manner by a person experienced in this type of drafting and submit in accordance with this Specification. 'Mark-ups' and 'overnotes' on the Contract Documents drawings will not be accepted as Shop Drawings. Shop drawings shall clearly indicate materials and methods, indicate coordination with other trades and bear signed approval of the Point Supported Glass Hardware manufacturer and the Point Supported Glass System installer. Drawings should include details of all supports and data to show provisions for vertical and horizontal expansion and deflections.

N. Shop drawings shall be submitted in .pdf format via electronic means that are fully referenced to marking plans and elevations and reviewable as an independent package. Drawing quality and density shall be clear, legible and to scale. A maximum of two reviews of each drawing have been allowed for. Unless indicated otherwise in the Contract Documents, provide the following information on the title block:

1. project identification.
2. the Artwork Glass Installation Sub-Contractor's name.
3. date of preparation of submission, and of revision where applicable, issue status.
4. shop drawing number and title of item to which the shop drawing refers.
5. relevant Drawing numbers and Specification clauses.
6. names of person or firm preparing shop drawings, if different from the Artwork Glass Installation Sub-Contractor.
7. the Artwork Glass Installation Sub-Contractor's statement or stamp on each shop drawing, verifying that it has examined and approved.

O. Shop Drawings shall be issued for both Design-in-Principle and Full documentation as outlined below:

1. Design-in-Principle Documentation: Prepare shop drawings to demonstrate the typical systems and interfaces prior to the preparation of Full shop drawings.
2. Full Documentation: Once the design-in-principle drawings have been reviewed and modified as deemed necessary by all parties, prepare clear and complete details of each assembly, component and connection together with all information relative to their fabrication, material, surface treatment and erection.
3. Submissions shall be complete for the area of work including all relevant cross-referenced plans, elevations, details and calculations.

P. The shop drawings shall include, but not be limited to:

1. Marking plans, elevations and sections showing the location of and marking proposed for each element, including any secondary support system.
2. Sectional details of all typical and non-typical elements and associated elements including interfaces with adjacent work.
3. Surrounding structure and relevant conditions.

4. Details of materials, construction, finish, fastener locations, Artwork Glass, Point Supported Glass Hardware and fixings arrangements and relationship with adjacent construction.
5. Schedule identifying each unit, with marks or numbers referencing Drawings.
6. Method of fabrication.
7. Methods of installation, including fixings.
8. Material type, grade etc. (typically provided on the General Notes drawing).
9. Identification of type and extent of protective coating to be applied.
10. The type, size and spacing of welds (if welding is required).
11. Methods of assembly.
12. Type and location of attachments to be fixed onto the Armature.
13. Show dimensions, tolerances, profiles, product components, anchorages, and accessories.
14. Dimensions for fabricating individual components.
15. Method for support of glass with attachments that provide adequate restraint without constraining thermal expansion and thermal contraction.

Q. Where shop drawings, prepared by other (sub)-contractors or suppliers, indicate site dimensions which have not been taken, the Artwork Glass Installation Sub-Contractor shall take such site dimensions before submitting shop drawings, and enter them on all copies of the shop drawings. Where dimensions are given and marked 'verify' or 'verify on site', the Artwork Glass Installation Sub-Contractor shall verify dimensions and indicate that they are verified (or corrected) before submitting shop drawings. Where site conditions do not yet exist for taking or confirming of site dimensions, the Artwork Glass Installation Sub-Contractor shall note shop drawings with 'dimensions will be verified on site' before submitting.

R. Do not commence fabrication until the shop drawings have been reviewed and permission to proceed has been obtained from the Client. If materials are required to be ordered or fabricated by the Artwork Glass Installation Sub-Contractor in order to maintain the Construction schedule, prior to the issue of 'For Construction' shop drawings, the Artwork Glass Installation Sub-Contractor shall obtain the approval from the Client.

S. Keep current, approved copies of shop drawings on site.

T. Verification Samples: Coordinate with the Artist to determine samples. Coordinate with the Point Supported Glass Fabrication Sub-Contractor to supply the Artwork Glass and together make sample assemblies. As an example and minimum assumption of what might be required:

1. Four (4) 12" x 12" samples of Artwork Glass with Point Supported Glass Hardware (glass attachments and spider fittings) assembled with glass, bolts and accessories.
2. Point Supported Glass Hardware (Spider fitting) assembly with glass, bolt and accessories.

U. Mock-Ups: See section 1.08.G. of this specification.

V. Warranty: Manufacturer's warranties as described in section 1.11.

W. Installation Quality Control Plan: describing how alignment and registration will be verified and documented during installation.

X. Maintenance Manuals: Manufacturer's maintenance manuals. Include maintenance and repair procedures with concise written guidance from the installer and/or manufacturer describing safe methods for removing and reinstalling individual glass panels, including torque values and protective measures.

Y. As-Installed Alignment Record: photographs and measurements showing final panel locations and joint spacing for SFAC archival record.

Z. Closeout Submittals: At completion, submit to the Client:

1. Final as-built drawings.
2. Photographic documentation of the installation.
3. Completed and executed certificates of compliance.

1.08 QUALITY ASSURANCE

A. Pre-installation Conference and Inspection: After approval of submittals, but prior to beginning installation of the Works of this specification, the Artwork Glass Installation Sub-Contractor shall hold a meeting at the site attended by representatives of Owner, Architect, Main Building Contractor, Armature structural steel fabricator and erector to describe in detail the Point Supported Glass System to be installed, to establish agreement, coordination and responsibilities among involved trades, and to review the Artwork installation procedure and schedule including the methods of delivering and handling glass and installing the Point Supported Glass. The chemical compatibility of all glass materials and framing materials, including sealants if required, with each other and with like materials used in glass installation shall be established. The Artwork Glass Fabrication Sub-Contractor, if based outside of California or in another country, may attend this meeting remotely by videoconference. The Artwork Glass Installation Sub-Contractor shall prepare a detailed memo of this meeting and furnish copies to the Owner's Representative and all involved trades.

B. The Artwork Glass Installation Sub-Contractor shall inspect the Armature to receive the Works of this specification and report defective conditions to the Owner's Representative and Main Building Contractor for correction prior to the installation of Artwork.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of ten (10) years documented experience in fabrication and erection of glass structures for projects of similar scope.

1. Minimum of10 years experience in the manufacture and fabrication of laminated glass.
2. Manufacturer must use a point supported glass system comprised of domestically produced hardware and is fabricated and assembled in the USA.
3. Manufacturer must be recognized by NAMI.
4. Manufacturer must be a member in good standing of the National Glass Association (NGA).

D. Installer Qualifications: Provide installation by an installer experienced in performing the Works of this section that has specialized in installation of work similar in scope and complexity required for this project for a minimum of ten (10) years and is acceptable to the SEOR. The installer shall be responsible for supplying Point Supported Glass Hardware and erecting the complete Point Supported Glass System, coordinating and maintaining tolerances between the Armature and Point Supported Glass system with individual component suppliers and manufacturers, and installation of the Point Supported Glass system. Installer should have demonstrated experience installing complex, architecturally integrated glass systems or artworks where precise alignment and finish are essential to the final presentation.

E. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

F. Quality Standards: In addition to Code, provide the Works of this Section so designed that glass installation conforms with ANSI Z97.1 and Federal Safety Standard 16 CFR 1201 for Category II materials.

G. Mock-Up: Construct a mock-up with actual materials in sufficient time for the Artist's review and to not delay construction progress. Coordinate with the Artwork Glass Fabrication Sub-Contractor for the supply of the Artwork Glass for the mock-up(s). Locate mock-up as acceptable to the Artist. Provide temporary foundations and support for the mock-up. These panels shall be selected to represent the final installation in terms of attachment of glass to support structure.

1. Intent of mock-up is to demonstrate surface preparation techniques, quality of workmanship and visual appearance.
2. The mock-up will be standalone and will not be included in the completed Artwork.
3. Provide a full-scale mock-up (min 4 × 4 ft) with Point Supported Glass Hardware representing imagery, color, and finish for SFAC and Artist approval prior to production.
4. Refinish mock-up area as required to produce acceptable work.
5. Do not continue with remaining work until workmanship, color, and sheen are approved by Artist.
6. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
7. Do not alter or remove mock-up until work is completed or removal is authorized.
8. Retain approved mock-up until final completion as visual standard for comparison with completed work.
9. Upon project closeout, mock-up panel to be delivered to SFAC Collections for archival storage.
10. A total of four (4) Artwork Glass panels shall be installed on the as-built support structure as part of a second mock-up. This second mock-up will be included in the completed Artwork.

H. Glass Tests: Assume a minimum of three glass panels, with 6 point supports each, will be tested to failure by the Artwork Glass Fabrication Sub-Contractor. Provide Point Supported Glass Hardware to the Artwork Glass Fabrication Sub-Contractor for these tests. 18 glass point fixings will be required including shipping to the Artwork Glass Fabrication Sub-Contractor.

1.09 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer’s instruction for receiving, handling, storing and protecting Point Supported Glass and Point Supported Glass Hardware.

B. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

D. Exercise exceptional care to prevent edge damage to glass and damage/deterioration to coating on glass.

1.10 PROJECT / SITE CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Environmental Requirements: Installation of glass products at ambient air temperature below 40 degrees F (4.4 degrees C) is prohibited.

C. Field Measurements: When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products.

1.11 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty against defects in materials and workmanship commencing at Substantial Completion and transfer of ownership to the City and County of San Francisco.

1. Warranty for Point Supported Glass Hardware: Provide supplier’s and manufacturer's standard warranty for the design integrity, weatherability and durability of the Point Supported Glass System components for up to 10 years.

B. Installer Warranty

1. Warrant the installation for a period of 10 years for installation and repairs or failures. Provide written requirements for notification of installer and terms for maintaining warranty provisions in accordance with owner’s, or Client’s, rights in Division 1 of the specifications.

C. Provide manufacturers and installer’s certificates that all of the Works are in accord with approved shop drawings and specifications and are free from defects in materials and workmanship.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer is used in this section to refer to a firm that produces primary glass or fabricated glass and Point Supported Glass Hardware as defined in the referenced standards.

B. Acceptable Glass Manufacturer: Glassmalerei Peters Studio (Peters).

C. Acceptable Point Supported Glass Hardware Manufacturer and Supplier: C.R. Laurence Co., Inc. (CRL).

D. Substitutions: only as approved by the Artist and the SEOR.

2.02 MATERIALS

A. Glass (procured by Point Supported Glass Fabrication Sub-Contractor):

1. All glass must be ultra- clear (low iron) laminated glass with two plies of fully tempered (FT) float glass and structural interlayer laminated glass. Laminated glass is to be produced using laid-in place interlayer bonded via an autoclave heat and pressure process with vacuum bag. Minimum interlayer thickness is to be 0.060". (Poured or cast resin laminates will not be permitted.)

2. All glass shall be ultra- clear (low iron) laminated glass with 5/16" (8 mm) fully tempered outer lite + 0.060” (1.52 mm) sentryglas ionoplast interlayer + 5/16" (8 mm) fully tempered inner lite with center of holes for point supports located as per Contract Documents.

3. The Artwork Glass will include Artist-designed graphics integrated into the glass panels with colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.

4. Fully tempered (FT) glass: a flat, monolithic, glass lite of uniform thickness that has been subjected to a special heat treatment process where the residual surface compression is not less than 10,000 psi (69 MPa) or the edge compression not less than 9,7000 psi (67 MPa) as defined in ASTM specification C1048.

5. Approximate maximum allowable edge stress (allowable) for glass lites associated with a maximum probability of breakage (P_b) less than or equal to 0.008 for a 3-s load duration for tempered glass is 10,600 psi (73.0 MPa).

B. Finishes

1. All exposed surfaces will be free of scratches and other serious blemishes.
2. Surface finish and gloss level shall match approved mock-up panel.

C. Fittings (Point Supported Glass Hardware)

1. "Spider" type attachment fittings for walls are predominately manufactured from Stainless Steel Grade 316.
2. The finish of all fittings shall be brushed stainless.
3. Glass attachments by CRL shall be HSF14BS Swivel Head Cap Mount with the following spider fittings:

    a. FMH2BS double arm for:

        1. Vertical edges (two points).
        2. Intermediate middle points (for 6 points supported glass panels).

    b. FMH1BS single arm (one point) for:

        3. Top & bottom corners.
        4. Vertical edges at the double horizontal tubes (separation joint at the Armature HSS vertical post splices).
        5. Middle points (for 6 points supported glass panels) at top and bottom edges.
        6. Middle points (for 6 points supported glass panels) at the double horizontal tubes (separation joint at the Armature HSS vertical post splices).

    c. FMH4BS four arm "V" for:

        7. Typical four glass panel connections (four points).

    d. FMH2VBS double arm "V" for:

        8. Single-double arm (two points) for the top & bottom edges and for the intermediate (two points) at the double horizontal tubes (separation joint at the Armature HSS vertical post splices).

4. Point Supported Glass Hardware shall meet the requirements of the Contract Documents. Any proposed substitutions for the Point Supported Glass Hardware shall be approved by the SEOR and shall be shown by the Artwork Glass Installation Sub-Contractor to be in compliance with this specification in all respects and shall be demonstrated by calculation and tests that the stresses induced in the glass by these fittings are compatible with the strength of the glass.
5. Point Supported Glass Hardware shall provide a tolerance capability that will cope with the full range of movements shown in the Contract Documents:

    a. Thermal movements occurring as a result of differential coefficients of thermal expansion within the range specified. The components used within the system will noiselessly withstand all thermal movements without any

buckling, distortion, cracking, failure of joint seals or undue stress on the glass or fixing assemblies.

b. Deflection of the Armature due to loading applied after the erection of the Point Supported Glass system to the magnitude specified.

c. Maximum side sway of the structure due to wind load and/or seismic occurring to the magnitude specified or seismic movement to the degree specified.

d. Deflection due to self-weight of the Point Supported Glass system.

e. Inward and outward movements due to the design wind loads and/or seismic loads specified.

6. Artwork Glass to be reviewed by the Artwork Glass Installation Sub-Contractor including compatibility with the Point Supported Glass Hardware, installation sequences and coordination with allowances for tolerances and movements (translations and rotations). The Artwork Glass Installation Sub-Contractor shall provide written confirmation that the Artwork Glass, procured by the Artwork Glass Fabrication Sub-Contractor, is compatible with the Point Supported Glass Hardware.

7. Point Supported Glass Hardware (caps, ball joints, bolts, washers, articulated swivel bolts, etc.) shall be machine finished stainless steel grade 316, or conventional glass attachment system assemblies.

8. Bushings will be UV-resistant nylon.

9. Gaskets will be fully vulcanized fiber, neoprene or pre-cured silicone.

D. Stainless Steel: All fittings and fasteners to be stainless steel grade 316, unless noted otherwise.

1. The finish shall not discolor during its design life when subjected to normal atmospheric conditions.

2. Finish of exposed stainless sheet shall be in accordance with the Contract Documents and the Artist's requirements, modified with a surface roughness less than 0.5µm or otherwise in accordance with the Contract Documents. Refining operations shall use silicone cortide (SiC) 320 grit abrasives.

3. Ensure that all stainless steel components are free from risk of mild steel contamination. This may be achieved through an approved passivation process. Electropolish stainless steel after carrying out any other finishing processes. Drilling, cutting, etc. should be done slowly and with sharp tools to prevent the build-up of heat.

4. Fully finish all visible welds to match adjacent surfaces. All stainless steel that is welded or machined/cut shall be re-passivated by an approved procedure.

E. Fasteners

1. All bolts visually exposed or subject to weather shall be grade 316 stainless steel.

2. All nuts and washers visually exposed or subject to weather shall be stainless steel ASTM F594.

2.03 FABRICATION

A. Fabrication methods shall maintain visual fidelity to approved samples and avoid any process that alters color tone or transparency of the Artist's imagery.

B. Fabricate components in accordance with approved Shop Drawings.

C. Major fabrication must done at the manufacturing location.

D. Disassemble only to the extent necessary for shipping and handling limitations.

E. Manufacturer is to be notified of any field modification prior to the activity commencing.

F. Welding, if required, is to comply with standards set forth by the American Welding Society.

G. Factory-grind exposed welds, if welding is required, smooth and flush with adjacent surfaces prior to finish application; restore mechanical finish.

H. Isolation membrane materials to be used to separate dissimilar metals to prevent galvanic corrosion/action between materials.

I. Fabricate components to allow for accurate and rigid fit of Point Supported Glass Hardware and Armature framing connections. Match components carefully ensuring continuity of line and design. Ensure joints and connections will be flush and weather tight. Ensure slip joints make full, tight contact and are weathertight.

J. Fabricate components true to detail and free from defects impairing appearance, strength or durability.

K. Reinforce components at anchorage and support points, joints, and attachment points for interfacing work.

PART 3 - EXECUTION

3.01 APPROVAL TO PROCEED

A. Do not proceed with the installation of the Works until receiving written approval relating to the shop drawings, relevant performance test report and the shop and on-site quality control procedures. The approval will be accompanied by a written statement that the Client has reviewed and accepted the test performance.

B. Prior to proceeding with full installation, review the first installed panel assembly with SFAC and the Artist to confirm visual alignment and joint appearance.

3.02 EXAMINATION AND ACCEPTANCE OF COMPLETED STRUCTURE

A. Examine surfaces receiving the work. Verify dimensions of in-place and subsequent construction. Follow the recommendations of GANA (Glass Association of North America) as to inspection procedures. Do not begin work until unsatisfactory conditions have been corrected. Installation of work will constitute acceptance of the related construction.

B. Take all necessary site measurements and check all adjacent structure to the work required or from which the Contract Works are supported. Before the installation of the Artwork, undertake a survey of the preceding elements of work including the details of points of attachments for the Artwork to the Armature where appropriate. Do this as soon as possible and submit the results without delay. If the preceding elements of work are outside the stipulated tolerances, inform and coordinate with the Client to agree the remedial action that is to be taken, allowing sufficient time for rectification, so as not to delay the Contract schedule.

C. Verify that supporting structure and anchor layout match approved drawings and allow consistent spacing and registration of artwork imagery before installation continues.

3.03 PREPARATION

A. Protect glass and equipment from damage caused by work of this Section.

B. Pre-installation review: the representatives of the Artwork Glass Installation Sub-Contractor, the architecturally exposed Armature structural-steel fabricator and erector, the Artwork Glass

Fabrication Sub-Contractor, the Artist, the SEOR, the architect's representative and the owner's representative shall review the installation procedure and schedule, including the method of delivering and handling glass, and installing the Point Supported Glass System materials. The chemical compatibility of all materials and framing with each other and with like materials used in glass fabrication will be confirmed.

C. If preparation is the responsibility of another installer, notify the Artist in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.04 INSTALLATION

A. Install in accordance with the Contract Documents and the Point Supported Glass System providers' requirements, the shop drawings, manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.

1. Separate dissimilar materials using nonconductive tape, paint, or other material not visible in finished work.
2. Provide attachments and shims to permanently fasten system to building structure.
3. Maintain dimensional tolerances and alignment with adjacent work.
4. Maintain consistent joint spacing and plane alignment across all panels to preserve the intended visual continuity of the artwork.
5. Perform alignment verification under even daylight or uniform lighting conditions.
6. Anchor securely in place, allowing for required movement, including but not limited to expansion and contraction.
7. Clean surfaces in accordance with sealant manufacturer's instructions and guidelines.

B. Coordinate with SFAC regarding visual checks during installation. SFAC or the Artist may request on-site review at defined milestones to confirm alignment and finish quality.

C. Employ only experienced glaziers who have had previous experience with the materials and systems being applied. Use tools and equipment recommended by the manufacturer.

D. Bolt torque: torque bolts to torques specified on shop drawings using a calibrated tool. Lock torque bolts into position to prevent back-off. Reset calibrations regularly to ensure an accurate torque.

E. Clean glazing connectors receiving Point Supported Glass System materials of deleterious substances that might impair the work. Remove protective coatings that might fail in adhesion or interfere with bond of sealants, if sealants are required. Comply with the manufacturer's instructions for final wiping of surfaces immediately before the application of any primer and/or glazing sealants. Wipe metal surfaces with an appropriate cleaning agent.

F. Inspect each unit of glass immediately before installation. Glass that has significant impact damage at edges, scratches, abrasion of faces or any other evidence of damage will not be installed.

G. Sealants: prime surfaces are to receive glazing sealants where required, in accordance with the manufacturer's recommendations, using recommended primers.

H. Set the glass in a manner that produces the greatest possible degree of uniformity in appearance. Face all glass per Artist's direction.

I. Installation tolerances for glass units: Install Contract Work to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; non-cumulative.
2. Level: 1/8 inch in 20 feet; non-cumulative.
3. Alignment: End-to-end or edge-to edge-offset of adjoining consecutive element 1/16 inch.
4. Location and Plane: Limit variation from plane to 1/8 inch in 12 feet; ½" over total length.
5. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.
6. Deviation between face of gasket on the fittings from ideal plane: + or – 1/16 inch.
7. Control plane and level of fittings such that any stress induced by planar or level offsets are minimized. Follow Glass fitting manufacturer's instructions.

J. Use masking tape or other suitable protection to limit the coverage of glazing materials on the surfaces intended for sealants, if sealants are required.

K. Tool the exposed surfaces of glazing materials, if required.

L. Clean excess sealant or other materials from the glass and support members immediately after the application, using solvents or cleaners recommended by the manufacturers.

M. Ensure that safety markings on glazing units are accessible for inspection.

3.05 CLEANING

A. Clean and protect products in accordance with the manufacturer's recommendations.
1. Remove temporary coverings and protection of adjacent work areas.
2. Clean and dress sealant, if sealants are required, prior to installation completion.
3. Clean glass prior to installation completion.
4. Clean the entire enclosure one time at the completion of the installation. Cleaning to include surface cleaning of glass, hardware and cleanup of construction debris.

B. Clean excess sealant or compound from Point Supported Glass System and Armature framing members and connections immediately after application, using solvents or cleaners recommended by manufacturers.

C. Glass to be cleaned according to:
1. GANA Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
2. GANA Glass Information Bulletin GANA TD-02-0402 – Heat-Treated Glass Surfaces Are Different.

D. Use only neutral-pH cleaners; ammonia, abrasive, and acidic products are prohibited.

E. Do not use scrapers or other metal tools to clean glass.

F. Glass nicks and damaged edges will not be accepted. Replace glass with damaged edges.

3.06 COMPLETION

A. Certification: At the completion of the work of each subcontract, and as a precondition to final payment for that subcontract, submit completed and executed certificates of compliance.

B. Maintenance Instruction: At a time mutually arranged, near substantial completion, provide for a meeting between the Client and permanent maintenance staff to review and instruct maintenance staff in the proper procedures for replacing any damaged glass and/or hardware.

C. Maintenance Inspection: Maintenance and inspection of the Artwork is regarded as an important factor in ensuring satisfactory long-term performance.

1. After substantial completion, carry out an inspection of the entire Artwork.
2. Provide the Client with sufficient guidance so that the Client could inspect the entire Artwork six months after the date of substantial completion. The Client should plan for subsequent inspections of the entire Artwork at two year intervals during the Warranty Period.
3. All inspections shall include at least one representative from the Client.

D. Operations and Maintenance Manual: Collaborate with the Artwork Glass Fabrication Sub-Contractor to develop and submit for approval a strategy in the form of a maintenance manual and log book to ensure that elements likely to deteriorate significantly can be replaced or rectified. Identify maintenance in terms of routine (e.g. cleaning) and in terms of component repair/replacement. Analyze each system to define the sequence under which components are likely to fail.

1. Include documentation describing safe removal, replacement, and cleaning procedures for future maintenance.
2. Provide a photographic record of final installation showing each elevation and panel numbering for SFAC's archive.

G. On completion, but within 30 days of the date of substantial completion, provide three copies of the maintenance manual procedures to the General Contractor for the satisfactory long-term care and regular maintenance of the Artwork (and associated works), including:

1. Data reference sheets and a general description of the system, which shall identify all elements incorporated in the Artwork, list all items supplied and installed, provide a reference to appropriate drawings and trade literature included and identify different areas served by the system.
2. A detailed description of specific items with product names, types, serial numbers, etc.
3. The name, address and telephone number of each firm and / or Contractor involved in the supply or fabrication of materials, components, assemblies and finishes.
4. Schedule for future inspection and testing of the Artwork, which shall set out the procedures to be followed for future inspection, testing and planned preventative maintenance procedures together with a suggested time program.
5. A method statement showing the means of access to all parts of the Artwork with recommended safe loadings.
6. Copies of manufacturers' warranties, service manuals, brochures, recommendations, etc.
7. Copies of test and approval certificates,
8. A list of replacement parts recommended to be held on site, with the names of suppliers.
9. Realignment and adjustment instructions where relevant.
10. Procedures for dismantling and reassembling.
11. Finishes and their architectural description.
12. Cleaning and general maintenance instructions, which shall provide complete details of all cleaning and general maintenance requirements for the Artwork.

E. Include in the Manual a Logbook, with pages set up for recording the times of performance of the above procedures, sufficient in number to receive the entries for three years. Show examples of typical entries by recording any maintenance procedures (such as cleaning) performed during

the contract and defects liability periods. The Manual and Logbook shall be 8.5 x 11 size, printed or typed on durable printing paper, each page consecutively numbered, neatly bound in durable vinyl or similar hard covers, and permanently labelled with the project name and date of issue. Supply any word processing files in Adobe Acrobat PDF format on a flash drive.

F. Record Drawings: Progressively produce and maintain 'as-built' drawings to accurately record positions and construction of all Artwork elements. Record drawings shall include revisions to hardware schedules. Such drawings shall be available for inspection and checking by the Client from time to time. Obtain approval on the form of presentation of record drawings before preparing final drawings. Unless other requirements are specified or given in writing by the Client, record drawings shall consist of:

   1. Legible and high quality black and white drawings on a reproducible medium (plain paper photocopy), and.

   2. One flash drive, containing a copy of each shop drawing, 'AS BUILT DRAWING', and the like relevant to the installation, in .pdf or .dwg format.

G. Spares: At or before substantial completion, deliver spares as required by the General Contractor to site in strong, waterproof protective packages marked for identification, and store where directed.

END OF SECTION

STRUCTURAL ABBREVIATIONS

A	
A.B.	ANCHOR BOLT
AC	ALASKA CEDAR (WOOD)
ABT	ABOUT
ABV	ABOVE
ADD'L	ADDITIONAL
ADJ.	ADJACENT
ALT.	ALTERNATE
AMP.	AMPLITUDE
AGGR.	AGGREGATE
APPROX.	APPROXIMATE(LY)
ARCH.	ARCHITECT(URE)(URAL)
B	
BD	BOARD
BF	BRACED FRAME
B.F.	BOUNDARY FASTENER
B.L.	BOTTOM LOWER
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
B.N.	BOUNDARY NAIL(ING)
BOT.	BOTTOM
B.A.	BOTTOM OF
B.A.C.	BOTTOM OF CONCRETE
B.A.F.	BOTTOM OF FOOTING
B.A.S.	BOTTOM OF STEEL
BRG	BEARING
B.S.	BOTH SIDES
BSMT	BASEMENT
B.U.	BOTTOM UPPER
BTWN	BETWEEN
C	
C	CHANNEL (STEEL SHAPE)
CFS	COLD-FORMED STEEL
CIDH	CAST-IN-DRILLED HOLE
C.I.P.	CAST-IN-PLACE
C.J.	CONSTRUCTION JOINT
C.J.P.	COMPLETE JOINT PENETRATION (GROOVE WELD)
CLG	CEILING
CLR	CLEAR, CLEARANCE
C.M.U.	CONCRETE MASONRY UNIT
COL.	COLUMN
COLL.	COLLECTOR
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCT(ING)(ION)
CONT.	CONTINUOUS
CONTR.	CONTRACT(OR)
CRVD.	CURVED
C.P.	COMPLETE PENETRATION (WELD)
CST.	CONSTRUCTION
CTR	CENTER, CENTRAL
CTSK	COUNTERSINK
CWT	COUNTERWEIGHT
CVN	CHARPY V-NOTCH
D	
d	PENNY WEIGHT (NAIL)
D2L	NELSON WELDED REBAR
D.B.A.	DEFORMED BAR ANCHOR
DBL	DOUBLE
DEMO.	DEMOLITION
DTL	DETAIL
DF	DOUGLAS FIR (WOOD)
DIA.	DIAMETER
DIAG.	DIAGONAL
DIM.	DIMENSION
DISCONT.	DISCONTINUOUS
DN	DOWN
DO	DITTO
DP	DEEP
DWG	DRAWING
E	
(E)	EXISTING
EA.	EACH
E.A.	EACH FACE
E.B.	SUCH AS
EL.	ELEVATION
ELEC.	ELECTRICAL
ELEVR	ELEVATOR
E.J.	EXPANSION JOINT
EMBED.	EMBEDMENT
E.N.	EDGE NAIL(ING)
E.O.	EDGE OF
E.O.S.	EDGE OF SLAB
E.P.S.	EXPANDED POLYSTYRENE
EQ.	EQUAL (EQUIVALENT)
EQ.	SP. EQUALLY SPACED
EQUIP.	EQUIPMENT
E.S.	EACH SIDE
E.W.	EACH WAY
E.W.E.F.	EACH WAY, EACH FACE
E/W	EAST/WEST
EXP.	EXPANSION
EXT.	EXTERIOR
F	
FB	FLAT BAR (STEEL SHAPE)
F.D.	FLOOR DRAIN
FDN	FOUNDATION
F.F.	FAR FACE OR FIELD FASTENER
FIN.	FINISH(ED)
FLG.	FLANGE
FLR	FLOOR
F.N.	FIELD NAIL
F.O.	FACE OF
F.O.C.	FACE OF CONCRETE
F.O.S.	FACE OF STUD OR FACE OF STEEL
F.P.	FULL PENETRATION (WELD)
FPRF.	FIREPROOFING
FRMG	FRAMING
F.S.	FAR SIDE
FT	FEET OR FOOT
FTG.	FOOTING
G	
ga	GAUGE
GALV.	GALVANIZED
GAR.	GARAGE
G.B.	GRADE BEAM
G.C.	GENERAL CONTRACTOR
GEN.	GENERAL
GLB	GLUED LAMINATED TIMBER BEAM
GLC	GLUED LAMINATED TIMBER COLUMN
GR.	GRADE
GYP.	GYPSUM
H	
(H),	HORIZ. HORIZONTAL
H..A.	HOLLOW CLAY TILE
HD	HOLDOWN
H.D.G.	HOT-DIP GALVANIZED
HDPE	HIGH-DENSITY POLYETHYLENE
HDR	HEADER
HGR	HANGER
HK	HOOK
H.S.	HEADED STUD OR HIGH STRENGTH (BOLT)
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
I	
I.D.	INSIDE DIAMETER
I.E.	THAT IS, SPECIFICALLY
I.F.	INSIDE FACE
IN.	INCH
INCL.	INCLUDED
INFO.	INFORMATION
INSP.	INSPECTION
INSUL.	INSULATION
INT.	INTERIOR
IRREG.	IRREGULAR
J	
JCT.	JUNCTION
JST	JOIST
JT, JNT	JOINT
K	
K	KIP (1,000 POUNDS)
K.D.	KILN DRIED
KSI	KIPS PER SQUARE INCH
KSF	KIPS PER SQUARE FOOT
L	
L	ANGLE (STEEL SHAPE)
LB.	POUND
LGS	LIGHT-GAUGE STEEL
L.L.B.B.	LONG LEGS BACK TO BACK
L.L.C.	LONG LEG HORIZONTAL
L.L.V.	LONG LEG VERTICAL
LMBR	LUMBER
L.S.	LONG SLOTTED (HOLE)
LSL	LAMINATED STRAND LUMBER
LSLH	LONG SLOTTED (HOLE) W/ LONG AXIS HORIZ.
LSLT.	LONG SLOTTED (HOLE)
LSLV	LONG SLOTTED (HOLE) W/ LONG AXIS VERT.
LTWT	LIGHTWEIGHT
LVL	LEVEL OR LAMINATED VENEER LUMBER
LWC	LIGHTWEIGHT CONCRETE
M	
MANUF.	MANUFACTURER
MATL	MATERIAL
MAX.	MAXIMUM (NO MORE THAN; AT MOST)
M.B.	MACHINE BOLT
MC	MISCELLANEOUS CHANNEL (STEEL SHAPE)
MECH.	MECHANICAL
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MEZZ.	MEZZANINE
MF	MOMENT FRAME
MFR	MANUFACTURE(R)
M.I.	MALLEABLE IRON
MIN.	MINIMUM (NO LESS THAN; AT LEAST)
MISC.	MISCELLANEOUS
MOD.	MODIF(Y)(ICATION)
MT	MISCELLANEOUS TEE (STEEL SHAPE)
MTL	METAL
N	
N	NORTH
(N)	NEW
N/A	NOT APPLICABLE
N.F.	NEAR FACE
N.I.C.	NOT IN CONTRACT
NO.	NUMBER
NOM.	NOMINAL
N&FS	NEAR & FAR SIDE
N.T.S.	NOT TO SCALE
NR	NEAR
N.S.	NEAR SIDE
N/S	NORTH/SOUTH
N.W.	NORMAL WEIGHT
NWC	NORMAL WEIGHT CONCRETE
O	
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.F.	OUTSIDE FACE
OG	OPEN GRAIN (REDWOOD)
O.H.	OPPOSITE HAND
OP'G	OPENING
OPNG	OPENING
OPP.	OPPOSITE
ORIG.	ORIGINAL
O.S.	OVERSIZED (HOLE)
P	
P.A.F.	POWDER ACTUATED FASTENER(S)
PC, PCS	PIECE, PIECES
PCF	POUNDS PER CUBIC FOOT
PCI	POUNDS PER CUBIC INCH
P.D.	POWDER DRIVEN
P.D.F.	POWDER DRIVEN FASTENER(S)
P.E.F.	(PLYWOOD) PANEL EDGE FASTENER
P.E.N.	(PLYWOOD) PANEL EDGE NAILING
PERF.	PERFORATED
PIPE-X	EXTRA STRONG PIPE
PIPE-XX	DOUBLE EXTRA STRONG PIPE
P.J.P.	PARTIAL JOINT PENETRATION (GROOVE WELD)
PL	PLATE
P.L.	PROPERTY LINE
PLWD.	PLYWOOD
PLYW'D	PLYWOOD
P.P.	PARTIAL PENETRATION (WELD)
PREFAB.	PREFABRICATE(D)
PRELIM.	PRELIMINARY
PRESTR.	PRESTRESSED
PREV.	PREVIOUS(LY)
PROJ.	PROJECT(ED)(ING)(ION)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PT	POINT
P.T.	POST-TENSION(ED)(ING)
R	
(R)	REUSED
RAD.	RADIUS
RB	ROUND BAR (STEEL SHAPE)
R.C.	REINFORCED CONCRETE
REINF.	REINFORC(ED)(ING)
REBAR	REINFORCING BAR
REF.	REFERENCE
REQ'D	REQUIRED
RET.	RETAINING
REV.	REVIS(E)(ION)
RF	ROOF
RFG	ROOFING
RND	ROUND
R.O.	ROUGH OPENING
RW	REDWOOD
S	
S.A.D.	SEE ARCHITECTURAL DRAWINGS
S.B.	SOLID BLOCKING
S.C.D.	SEE CIVIL DRAWINGS
SCHED.	SCHEDULE
SECT.	SECTION
S.E.D.	SEE ELECTRICAL DRAWINGS
SEP.	SEPARATION
SFHCS	SOCKET FLAT HEAD CAP SCREW
SHT	SHEET
SHTG	SHEATHING
SIM.	SIMILAR
S.L.B.B.	SHORT LEGS BACK TO BACK
S.L.D.	SEE LANDSCAPE DRAWINGS
SLRS	SEISMIC LOAD RESISTING SYSTEM
S.M.D.	SEE MECHANICAL DRAWINGS
S.M.S.	SHEET METAL SCREW
S.O.G.	SLAB ON GRADE
SP	SOUTHERN PINE (WOOD)
SPC.	SPAC(ES)(ING)
S.P.D.	SEE PLUMBING DRAWINGS
SPEC(S).	SPECIFICATION(S)
SQ.	SQUARE
S.S.	STAINLESS STEEL
S.S.	SHORT SLOTTED (HOLE)
SSLT.	SHORT SLOTTED (HOLE)
ST	AMERICAN STANDARD TEE (STEEL SHAPE)
STAG.	STAGGER(ED)
STAGG.	STAGGER(ED)
STD	STANDARD
STFNR.	STIFFENER
STL	STEEL
STRUC.	STRUCTURAL
SUP.	SUPPORT
SUSP.	SUSPENDED
SYM.,	SYMM. SYMMETRICAL
T	
T&B	TOP & BOTTOM
T&G	TONGUE & GROOVE
T.B.C.	TO BE CONFIRMED
T.B.D.	TO BE DETERMINED
TD	TIE DOWN
THD	THREADED
THK	THICK(NESS)
THRD	THREADED
THRU	THROUGH
T.L.	TOP LOWER
T.N.	TOE NAIL
T.O.	TOP OF
T.O.C.	TOP OF CONCRETE ELEVATION
T.O.F.	TOP OF FOOTING
T.O.S.	TOP OF STEEL
TS	TUBE STEEL
T.U.	TOP UPPER
TYP.	TYPICAL
U	
U.O.N.	UNLESS OTHERWISE NOTED
URM	UNREINFORCED MASONRY
V	
(V),	VERT. VERTICAL
VOL.	VOLUME
V.I.F.	VERIFY IN FIELD
V.W.M.	VERIFY W/ MANUF.
W	
W/	WITH
WD	WOOD
WF	WIDE FLANGE
W.H.	WEB HORIZONTAL
W/IN	WITHIN
WKG	WORKING
W.O.	WHERE OCCURS
W/O	WITHOUT
W.P.	WORK POINT
WPFG	WATERPROOFING
WT	WIDE-FLANGE TEE (STEEL SHAPE)
WT.	WEIGHT
W.W.F.	WELDED WIRE FABRIC
X	
XS	EXTRA STRONG (PIPE)
XXS	DOUBLE EXTRA STRONG (PIPE)

SPECIAL CHARACTERS

&	AND
@	AT
CL	CENTER LINE
Ø	DIAMETER OR ROUND
//	PARALLEL
PL	PLATE, PROPERTY LINE
#	POUND OR NUMBER
±	TOLERANCE

OTHER ABBREVIATIONS (PRODUCT ABBREVIATIONS):

FOR WOOD FRAMING FASTENER AND CONNECTOR ABBREVIATIONS, SEE SIMPSON STRONG-TIE WOOD CONSTRUCTION CONNECTORS CATALOG (available at www.strongtie.com).

FOR POWDER-DRIVEN FASTENERS AND CONCRETE ANCHOR ABBREVIATIONS, SEE HILTI NORTH AMERICAN PRODUCT TECHNICAL GUIDE (available at www.us.hilti.com) AND SIMPSON STRONG-TIE ANCHOR SYSTEMS CATALOG (available at www.strongtie.com).

FOR LIGHT-GAUGE STEEL CONNECTOR ABBREVIATIONS, SEE STEEL NETWORK LIGHT STEEL FRAMING CONNECTION CATALOG (available at www.steelnetwork.com) AND SIMPSON STRONG-TIE COLD-FORMED STEEL CONNECTORS CATALOG (available at www.strongtie.com).

FOR ENGINEERED WOOD PRODUCT ABBREVIATIONS, SEE iLEVEL CATALOG (available at www.ilevel.com), LP BUILDING PRODUCTS CATALOG (available at www.lpcorp.com), REDBUILT CATALOG (available at www.redbuilt.com), AND STANDARD STRUCTURES, INC., CATALOG (available at www.standardstructures.com)

"THRD STUD" INDICATES FULL FUSION WELDED STUD PER SPECIFICATION SECTION 05 12 00.

SPECIAL INSPECTION AND STRUCTURAL OBSERVATION

A COPY OF THIS DOCUMENT SHALL BE KEPT WITH THE APPROVED STRUCTURAL DRAWING SET

JOB ADDRESS 2000 Marin St ______ APPLICATION NO. ______ ADDENDUM NO. ___

OWNER NAME ______ OWNER PHONE NO. ______

Employment of Special Inspection is the direct responsibility of the OWNER, or the engineer/architect of record acting as the owner's representative. Special inspector shall be one of those as prescribed in Sec.1704. Name of special inspector shall be furnished to DBI District Inspector prior to start of the work for which the Special Inspection is required. Structural observation shall be performed as provided by Section 1704.6. A preconstruction conference is recommended for owner/builder or designer/builder projects, complex and highrise projects, and for projects utilizing new processes or materials.

In accordance with Chapter 17 (SFBC), Special Inspection and/or testing is required for the following work:

1. [ ] Concrete (Placement & sampling)
2. [ ] Bolts installed in concrete
3. [ ] Special moment - Resisting concrete frame
4. [ ] Reinforcing steel and prestressing tendons
5. **Structural welding:**
   - **A. Periodic visual inspection**
     - [ ] Single pass fillet welds 5/16" or smaller
     - [ ] Steel deck
     - [ ] Welded studs
     - [ ] Cold formed studs and joists
     - [ ] Stair and railing systems
     - [ ] Reinforcing steel
   - **B. Continuous visual inspection and NDT** (Section 1704)
     - [ ] All other welding (NDT exception: Fillet weld)
     - [ ] Reinforcing steel; and [ ] NDT required
     - [ ] Moment-resisting frames
     - [ ] Others ______
6. [ ] High-strength bolting
7. [ ] Structural masonry
8. [ ] Reinforced gypsum concrete
9. [ ] Insulating concrete fill
10. [ ] Sprayed-on fireproofing
11. [ ] Piling, drilled piers and caissons
12. [ ] Shotcrete
13. [ ] Special grading, excavation and filling (Geo. Engineered)
14. [ ] Smoke-control system
15. [ ] Demolition
16. [ ] Exterior Facing
17. **Retrofit of unreinforced masonry buildings:**
    - [ ] Testing of mortar quality and shear tests
    - [ ] Inspection of repointing operations
    - [ ] Installation inspection of new shear bolts
    - [ ] Pre-installation inspection for embedded bolts
    - [ ] Pull/torque tests per SFBC Sec.1607C & 1615C
18. **Bolts Installed in existing concrete or masonry:**
    - [ ] Concrete [ ] Masonry
    - [ ] Pull/torque tests
19. [ ] Shear walls and floor systems used as shear diaphragms
20. [ ] Holdowns
21. **Special cases:**
    - [ ] Shoring
    - [ ] Underpinning: [ ] Not affecting adjacent property
      - [ ] Affecting adjacent property: PA
    - [ ] Others
22. [ ] Crane safety (Apply to the operation of tower cranes on highrise building) (Section 1705.21)
23. [■] Others: "As recommended by professional of record" Glass and glass attachments
24. **Structural observation per Sec. 1704.6 for the following:** [ ] Foundations [ ] Steel framing [ ] Concrete construction [ ] Masonry construction [ ] Wood framing [ ] Other: ______
25. Certification is required for: [ ] Glu-lam components
26. [ ] Firestops in high-rise building

Prepared by: Danziger Engineering Collaborative, Inc. Attn: ______ Phone: (310) 404-1829
Engineer/Architect of Record

Required information:
FAX: (N/A) ______ Email: bruce.danziger@danzigerec.com

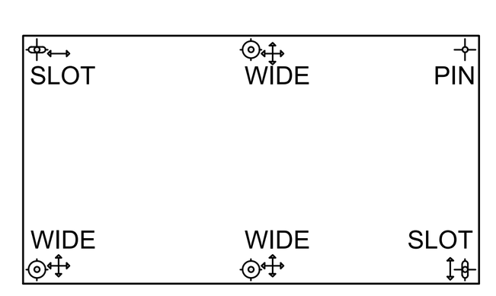
Review by: ______ Phone: (415) 558- ______
DBI Engineer or Plan Checker

****

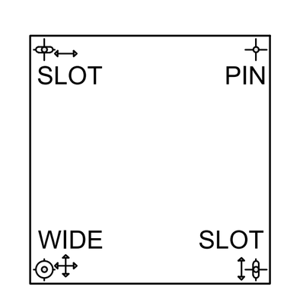
APPROVAL (Based on submitted reports.)

______
DATE DBI Engineer or Plan Checker / Special Inspection Services Staff

QUESTIONS ABOUT SPECIAL INSPECTION AND STRUCTURAL OBSERVATION SHOULD BE DIRECTED TO:
Special Inspection Services (415) 558-6132; or, dbi.specialinspections@sfgov.org ; or FAX (415) 558-6474



SIX POINT SUPPORT



FOUR POINT SUPPORT

GLASS SUPPORT NOTES:

1. ALL POINT SUPPORT SWIVEL HEADS ALLOW FOR FREE ROTATIONS AT THE CENTERLINE (HALF-THICKNESS) OF THE GLASS.
2. ALL POINT SUPPORTS PROVIDE OUT-OF-PLANE SUPPORT FOR WIND AND SEISMIC LOADS.
3. THE ENGINEERING DESIGN ASSUMPTIONS PROVIDE DETERMINANT SUPPORT WITH FREE MOVEMENTS TO ALLOW THE GLASS TO EXPAND AND CONTRACT FOR CHANGES IN TEMPERATURE WITH THE FOLLOWING:
   - PIN: RESTRAINT FOR VERTICAL AND HORIZONTAL LOADS IN THE PLANE OF THE GLASS.
   - HORIZONTAL SLOT: RESTRAINT FOR VERTICAL LOADS IN THE PLANE OF THE GLASS WITH FREE HORIZONTAL MOVEMENT.
   - VERTICAL SLOT: RESTRAINT FOR HORIZONTAL LOADS IN THE PLANE OF THE GLASS WITH FREE VERTICAL MOVEMENT.
   - WIDE: FREE HORIZONTAL AND VERTICAL MOVEMENTS IN THE PLANE OF THE GLASS .
4. THE HOLES IN THE GLASS WILL ALL BE TYPICAL WITHOUT SLOTS OR WIDE OVERSIZE HOLES. THE FREE MOVEMENT ALLOWANCES (SLOTS AND WIDES) SHALL BE PROVIDED BY THE GLASS ATTACHMENT HARDWARE.
5. CONTRACTOR TO PROPOSE METHOD FOR SUPPORT OF GLASS WITH ATTACHMENTS THAT PROVIDE ADEQUATE RESTRAINT WITHOUT CONSTRAINING THERMAL EXPANSION AND THERMAL CONTRACTION OF THE GLASS SIMILAR TO THE ENGINEERING ASSUMPTIONS LISTED ABOVE.
6. SEE SPECIFICATION SFWD 2000 MARIN SFAC ARTWORK POINT SUPPORTED GLASS INSTALLATION SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

1 / GLS1.1 — GLASS CONSTRAINTS AND RELEASES — N.T.S.

STRUCTURAL NOTES

DIVISION 01: GENERAL CONDITIONS

SECTION A: GENERAL REQUIREMENTS

1. These notes apply to all drawings and govern unless otherwise noted. All work shall conform to the 2022 California Building Code, as modified by state and local jurisdiction.
2. These structural drawings are copyrighted instruments of service of Danziger Engineering, for sole use for this project. Danziger CAD files may only be used as backgrounds for shop drawings after Danziger receives a signed waiver from each party using the files, addressing the limitations and proper use of these CAD files.
3. Verify all existing conditions and proposed dimensions at the job site. Compare structural drawings with architectural, mechanical, and electrical and plumbing drawings before commencing work. Notify Architect of any discrepancies and do not proceed with affected work until they are resolved. Do not scale drawings.
4. Unless otherwise shown or noted, all typical details shall be used where applicable. All details shall be considered typical at similar conditions.
5. Unless otherwise shown or noted, install, test, and inspect manufactured structural products in accordance with manufacturer's recommendations and applicable evaluation service reports.
6. The Contractor and Special Inspector shall contact the Structural Engineer regarding any questions of interpretation of these specifications and drawings.
7. Submittal Protocol:
   1. Shop drawings, calculations, and product data shall be submitted to, and reviewed by, General Contractor, Architect, Artist, and Engineer before fabrication. All submittals shall have a clear 3.5-inch by 7-inch space reserved for shop drawing stamps by General Contractor, Architect and Engineer. If submitted sheets do not have sufficient room, a cover sheet with a table of contents and sufficient space for stamps may be submitted.
   2. Each shop drawing submittal to the Engineer shall be submitted electronically:
      1. Except for mock-ups, samples, and as otherwise specified, all submittals to be in electronic form (Adobe Portable Document Format).
   3. Submit shop drawings well in advance of fabrication; allow at least three weeks for engineering review, and additional time for review and forwarding by Architect, Artist, and General Contractor, and for revisions and re-submittal, if required.
   4. Shop drawings shall be dated, and each update shall be identified with a unique revision number. All items on the shop drawings that vary from the Structural Drawings, alter structural details, or extrapolate from similar details, shall be circled by a cloud with the note "Engineer Verify."
   5. Once reviewed, shop drawings and product data shall not be changed, nor shall construction operations be deviated from, unless resubmitted and reviewed again. Review of shop drawings that contain deviations from Contract Documents shall not constitute acceptance of such deviations, unless specifically authorized by the Architect and Artist.
   6. Submittal review is of a general nature only, and responsibility for conformance with drawing intent shall remain with the Contractor. Review does not imply or state that Contractor has correctly interpreted the Contract Documents.
   7. Satisfactory review of shop drawings and product data must be obtained prior to fabrication or delivery of material to the site. The following items shall be submitted:
      1. Artwork Glass and Point Supported Glass Hardware shop drawings.
      2. Structural drawings and calculations for all shoring and bracing of existing and new structures, where needed to adequately support imposed vertical and lateral loads. These submittals are for information-only.
8. Safety Measures:
   1. At all times, Contractor shall be solely and completely responsible for job site conditions including safety of people and property, and for all necessary independent engineering reviews of these conditions.
   2. Engineer's job site visits are not intended to include review of adequacy of Contractor's safety measures.
9. Any openings, holes, cuts or discontinuities not shown on the structural drawings and extending into or through structural elements require Engineer's prior approval and may require special structural detailing. Existing concrete slab reinforcing outside of areas specifically called for demolition may not be cut without Engineer's prior approval.
10. Survey of Structure: Before preparing glass shop drawings, Contractor shall survey the building to locate all existing floor elevations, column centerlines, armature elevations and levels, interior and exterior face of wall, in order to locate new glass elements.

SECTION B: STRUCTURAL TESTING, INSPECTION, AND OBSERVATION

1. Provide tests and inspections for all items as required by the specifications, California Building Code and all applicable local ordinances.
2. The Owner shall retain an independent testing agency to perform all required testing and inspections.
3. The Contractor is responsible for coordinating with Owner's Testing Agency and Special Inspector to schedule all required tests and inspections.
4. The following specific items shall be inspected and/or tested by the testing lab:
   1. Artwork Glass Point Supported Glass Hardware.
   2. All bolted connections, including special requirements for high strength bolting.
5. Structural Observation: In addition to inspection by Special Inspector, Structural Engineer will review construction for general conformance with Structural Drawings. Contractor shall notify Structural Engineer at least five working days prior to concealing any structural items. Structural Engineer will then determine if a site visit is appropriate. Notification shall include the following items:
   1. Artwork Glass Point Supported Glass Hardware.
   2. Structural framing.

SECTION C: STRUCTURAL DESIGN BASIS

1. Construct in conformance with the 2022 California Building Code and all applicable local ordinances.
2. Design vertical loads:

	DL (psf)	LL
Glass Panel:	10	200lbs Point Load

3. Design lateral loads are based on the following criteria:
   1. Risk Category: III
   2. Wind
      1. Basic Wind Speed: 99 mph (3-second gust)
      2. Exposure Category: B
      3. Importance Factor, Iw: 1.00
      4. Gcp: 1.40
      5. Gcpi: 0.55
      6. Cladding Pressure: 35.3 psf
   3. Seismic
      1. Importance Factor, Ie:1.25
      2. S-s: 1.5 g (0.2 sec site specific response)
      3. S-1: 0.6 g (1.0 sec site specific response)
      4. Site Soil Class: B
      5. S-ds: 0.9 g (0.2 sec site specific response)
      6. S-d1: 0.32 g (1.0 sec site specific response)
      7. SDC: D (Seismic Design Category)
      8. Fp: 1.80 g (Seismic Response Coefficient)
      9. Rp: 1.5 (Component Response Mod. Factor)
      10. Ap: 2.5 (Component Amplification Factor)
      11. Analysis Procedure: Non-structural components Chap. 13 ASCE 07
4. The seismic load resisting system (SLRS) of the structure comprises the following elements described in the drawings:
   1. Bending in steel posts

SECTION D: PERFORMANCE CRITERIA

1. General:
   1. Submit shop drawings per specifications for Artwork Glass.
   2. Submit shop drawings and structural calculations per specifications for Point Supported Glass Hardware, stamped and signed by a licensed Civil or Structural Engineer.
2. Artwork Glass and Point Supported Glass Hardware to steel structures:
   1. Out-of-plane deflection shall not exceed L/175. Restrict deflection to ¾" (19mm) maximum for individual glass lites.

DIVISION 05: METALS

SECTION 05 12 00: STRUCTURAL STEEL AND MISCELLANEOUS IRON

1. Use ASTM A572 Grade 50 for typical threaded rods, and F1554 Grade 55 for threaded rods used as anchor bolts. ASTM A193 Grade B7 may be used in lieu of A449 or F1554 Grade 105.
   1. Threaded rod nuts and washers: Same as for machine bolts where A307 or A36 material is used otherwise use nuts as required by ASTM A490. Nuts to be heavy hex when embedded in concrete.
2. Unfinished (machine) bolt assemblies shall conform to ASTM A307 Grade A, with ASTM F844 washers (ANSI B18.23.1 if beveled).
3. Any steel exposed to weather shall be hot-dip galvanized per ASTM A123 (steel fasteners per ASTM A153 or B695, Class 55), or weatherproofed by an approved equal.
4. All work shall be performed in accordance with:
   1. AISC 360, "Specification for Structural Steel Buildings" and
   2. AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," modified as follows:
      1. No provision of AISC 303 shall be effective to change the duties and responsibilities of the Owner, Contractor, Architect and Structural Engineer from those set forth in these Contract Documents.
      2. Reference to AISC 303 is made only to technical issues and excludes all issues related to schedule, Owner's responsibilities, approvals and commercial terms.
      3. Where discrepancies exist between the requirements of the Contract Documents and AISC 303, the requirements of the Contract Documents shall govern and the corresponding provision of AISC 303 shall be assumed as being deleted.
      4. Contrary to AISC 303 Section 4.1, issuance of structural design drawings for bid does not constitute a release for construction. Prior to proceeding with mill orders, shop drawings or fabrication, Contractor shall confirm with Owner, Architect and Structural Engineer which portions of the work have been released for construction.

DIVISION 08: GLASS AND GLASS HARDWARE

1. Artwork glass by PETERS STUDIO, or approved equal.
2. All glass shall be ultra-clear (low iron) laminated glass with two plies of fully tempered (FT) float glass and structural interlayer.
3. Glass requirements (reference ASTM E1300):
   1. Fully tempered (FT) glass: a flat, monolithic, glass lite of uniform thickness that has been subjected to a special heat treatment process where the residual surface compression is not less than 10,000 psi (69 MPa) or the edge compression not less than 9,7000 psi (67 MPa) as defined in specification C1048.
   2. Approximate maximum allowable edge stress (allowable) for glass lites associated with a maximum probability of breakage (Pb) less than or equal to 0.008 for a 3-s load duration for tempered glass is 10,600 psi (73.0 MPa).
4. Glass shall be:
   1. 5/16" (8 mm) fully tempered outer lite + 0.060" (1.52 mm) SentryGlas Ionoplast interlayer + 5/16" (8 mm) fully tempered inner lite.
   2. Point supports located minimum 4" from the corners. Dimensions, size, and center points of holes for point supports located as per contract documents.
   3. The Artwork Glass will include Artist-designed graphics integrated into the glass panels with colored enamels digitally printed onto float glass. Color will be fired to the glass to form a permanent bond.
5. Glass Hardware (attachments and spider fittings) by C.R. LAURENCE or approved equal.
6. Glass attachments to be HSF14 Swivel Head Cap Mount with the following spider fittings:
   1. FMH2BS double arm for:
      1. Vertical edges (two points).
      2. Intermediate middle points (for 6 points supported panels).
   2. FMH1BS Single arm (one point) for:
      1. Top & bottom corners.
      2. Vertical edges at the double horizontal tubes (separation joint at the HSS vert post splices).
      3. Middle points (for 6 points supported panels) at top and bottom edges.
      4. Middle points (for 6 points supported panels) at the double horizontal tubes (separation joint at the HSS vert post splices).
   3. FMH4BS four arm "V" for:
      1. Typical four panel connections (four points).
   4. FMH2VBS double arm "V" for:
      1. Single-double arm (two points) for the top & bottom edges and for the intermediate (two points) at the double horizontal tubes (separation joint at the HSS vert post splices).
7. Glass attachment hardware to be confirmed by installer including compatibility with installation sequences and coordination with allowances for tolerances and movements (translations and rotations).
8. See "SFWD 2000 Marin SFAC Artwork Point Supported Glass Fabrication Specifications", "SFWD 2000 Marin SFAC Artwork Point Supported Glass Installation Specifications", and "San Francisco Arts Commission Artwork Coordination RFP" for additional requirements.
9. See 1/GLS1.1 for glass constraints and release requirements.

STRUCTURAL DRAWING SHEET INDEX

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San Francisco Water Power Sewer

Danziger Engineering Collaborative, Inc.
7402 McConnell Ave.
Los Angeles, CA 90045

REGISTERED PROFESSIONAL ENGINEER
BRUCE EDWARD DANZIGER
S-4917
Exp. 9-30-27
STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
53	2026.04.10	ARTS BID SET

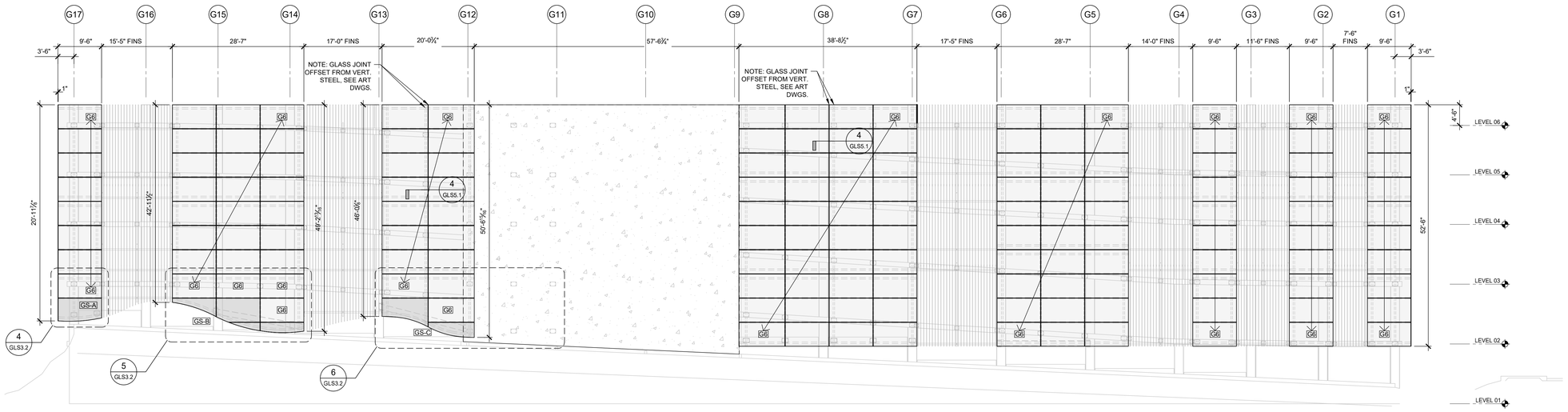
SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE
2000 MARIN STREET
SAN FRANCISCO, CA 94124
PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

STRUCTURAL ABBR., SHEET INDEX, & GENERAL NOTES

AS NOTED

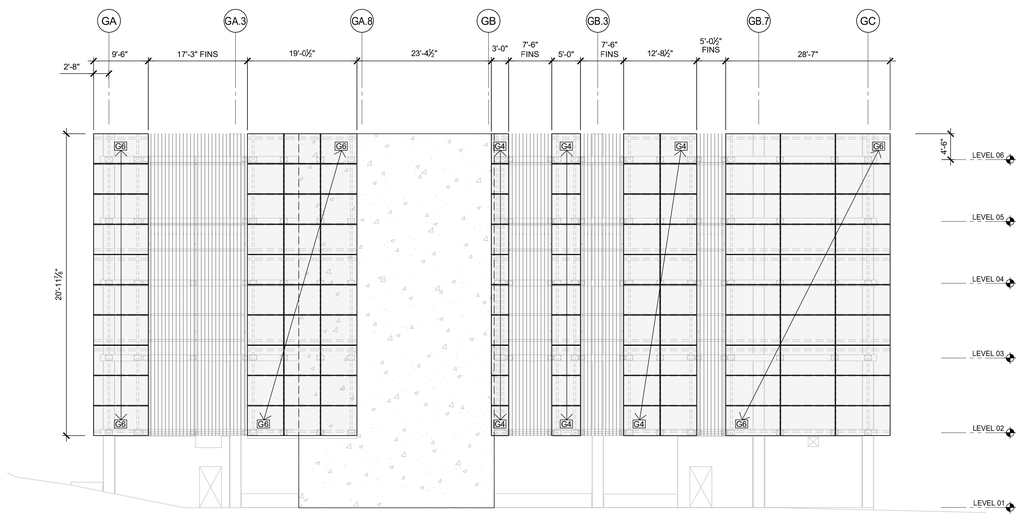
GLS1.1

Plotted: Friday, April 10, 2026 1:46:15 PM - By: kelso - Sheet Size: 30x42 - File: X:\2024dwgs\24070\struct\glass\070GLS1.1.dwg



NOTE:
1. SEE SHEET GLS3.2 FOR GLASS PANEL ATTACHMENTS.
2. DO NOT SCALE GLASS PANELS IN THIS ELEVATION.
3. SEE 1/GLS3.3 FOR BOTTOM OF GLASS CURVATURE.
4. EACH GLASS PANEL IS EQUALLY DIVIDED BETWEEN GLASS SECTIONS WITH 1" GAP.
5. GLASS PANELS SHALL BE CENTERED BETWEEN ADJACENT ALUMINUM FIN PANELS.
6. AT WEST ELEVATION, NO WORK SHALL OCCUR WITHIN A 10'-0" RADIUS OF (E) HIGH VOLTAGE POWER LINES

3 GLS3.1 — WEST ELEVATION — 3/32" = 1'-0"



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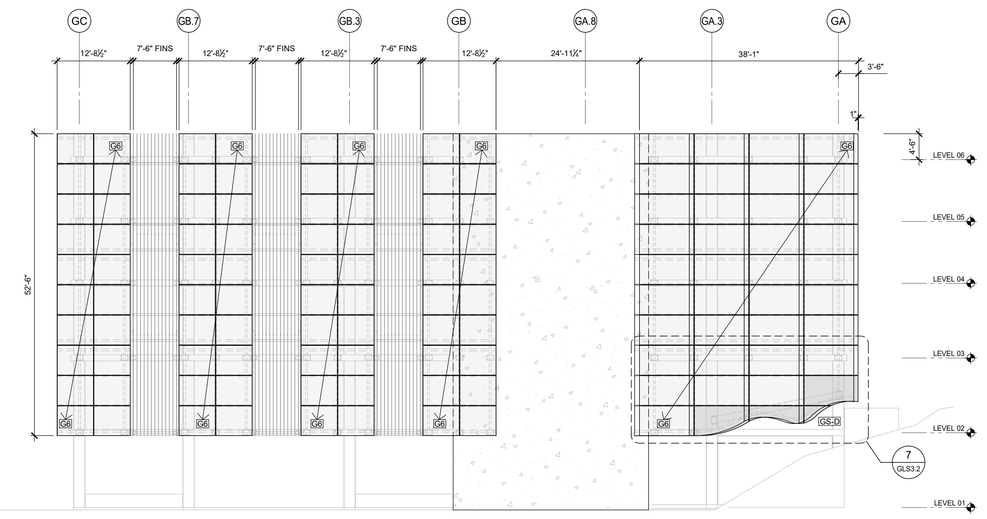
1 GLS3.1 — SOUTH ELEVATION — 3/32" = 1'-0"



NOTE:
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2. DO NOT SCALE GLASS PANELS IN THIS ELEVATION.
3. SEE 1/GLS3.3 FOR BOTTOM OF GLASS CURVATURE.
4. EACH GLASS PANEL IS EQUALLY DIVIDED BETWEEN GLASS SECTIONS WITH 1" GAP.
5. GLASS PANELS SHALL BE CENTERED BETWEEN ADJACENT ALUMINUM FIN PANELS.

2 GLS3.1 — NORTH ELEVATION — 3/32" = 1'-0"

KEY PLAN

FOR DBI USE ONLY

AS NOTED

GLS3.1

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MARK CAVAGNERO ASSOCIATES ARCHITECTS
1645 Sansome Street, Suite 200 T 415.398.6844
San Francisco, California 94111 F 415.398.6846
www.cavagnero.com

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

Danziger Engineering Collaborative, Inc.
7402 McConnell Ave.
Los Angeles, CA 90045

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2000 MARIN STREET
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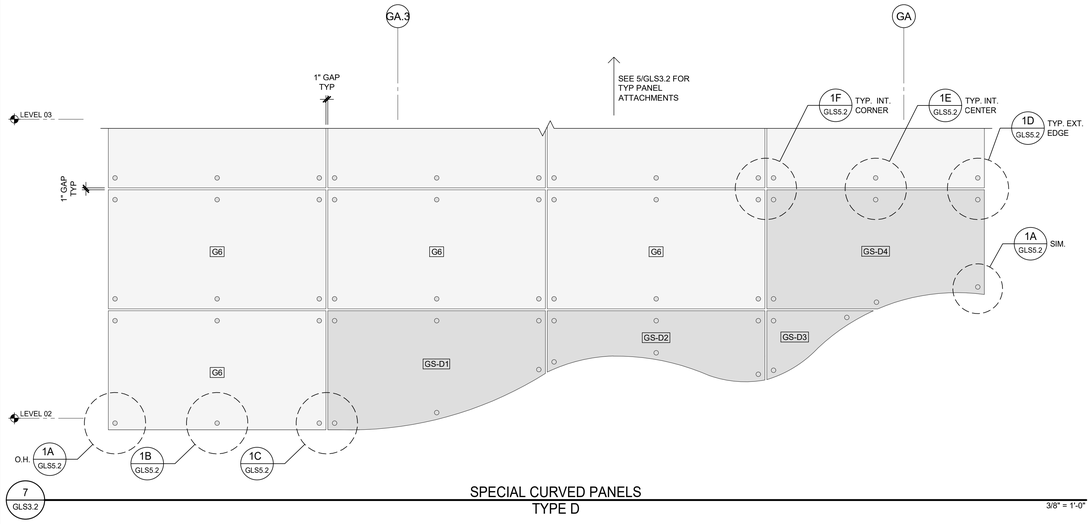
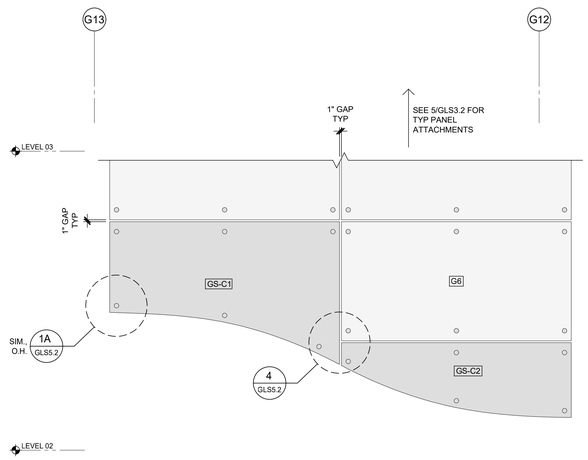
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

EXTERIOR ELEVATIONS
GLASS PANELS

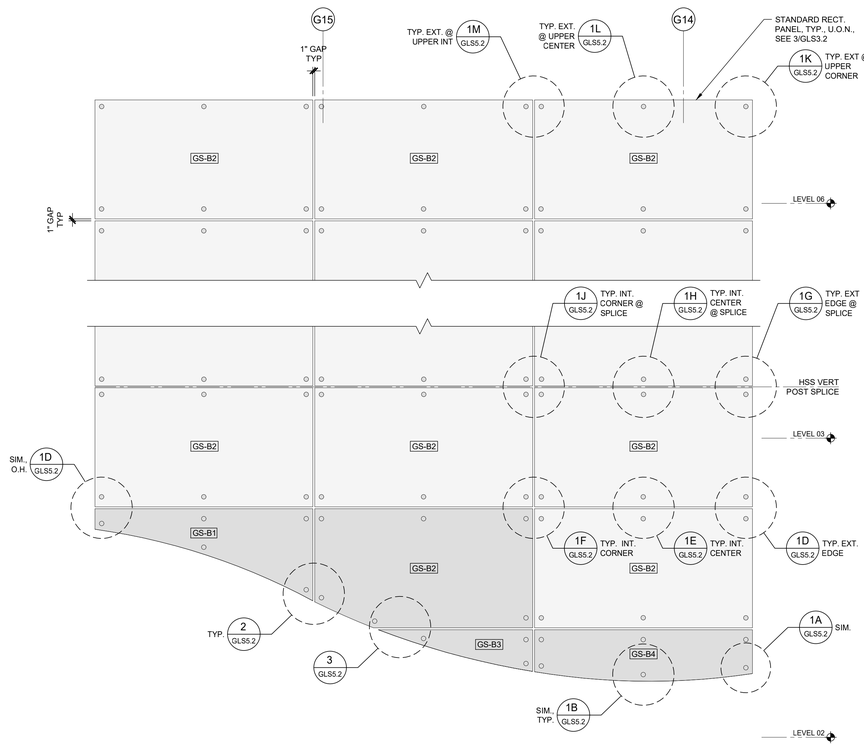


7 GLS3.2 — SPECIAL CURVED PANELS TYPE D — 3/8" = 1'-0"

NOTES:
1. SEE 1A/GLS5.1 FOR DIMENSIONS OF GAP BETWEEN INSIDE FACE OF GLASS AND OUTSIDE FACE OF STEEL HORIZONTAL HSS.
2. SEE 1A/GLS5.2 FOR MINIMUM CORNER DISTANCE (CENTER LINE OF GLASS HOLE TO CORNER OF GLASS).
3. SEE 1B/GLS5.2 FOR MINIMUM EDGE DISTANCE (CENTER LINE OF GLASS HOLE TO EDGE(S) OF GLASS).

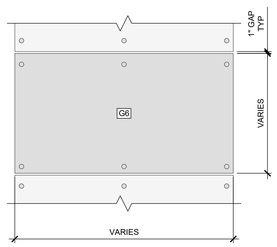


6 GLS3.2 — SPECIAL CURVED PANELS TYPE C — 3/8" = 1'-0"



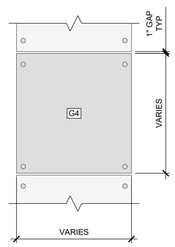
5 GLS3.2 — SPECIAL CURVED PANELS TYPE B — 3/8" = 1'-0"

4 GLS3.2 — SPECIAL CURVED PANELS TYPE A — 3/8" = 1'-0"



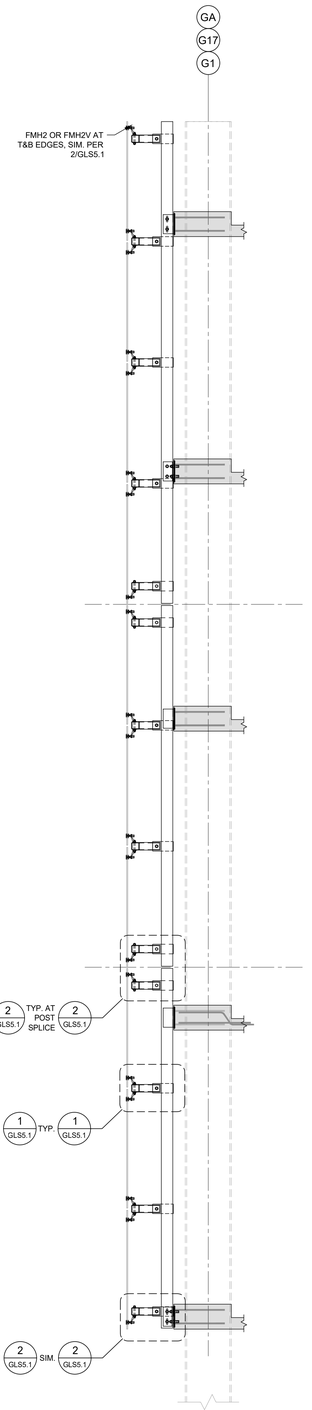
NOTE: SEE 1/GLS5.2 FOR GLASS ATTACHMENT BASED ON LOCATION OF PANEL

3 GLS3.2 — G6 - TYP. 6 POINT SUPPORTED GLASS PANEL — 3/8" = 1'-0"



NOTE: SEE 1/GLS5.2 FOR GLASS ATTACHMENT BASED ON LOCATION OF PANEL

2 GLS3.2 — G4 - TYP. 4 POINT SUPPORTED GLASS PANEL — 3/8" = 1'-0"



1 GLS3.2 — TYP TRANSVERSE SECTION — 3/8" = 1'-0"

KEY PLAN

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GLS3.2

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MARK CAVAGNERO ASSOCIATES ARCHITECTS
1645 Sansome Street, Suite 201 T 415.346.1824
San Francisco, California 94111 F 415.346.6445
www.markcavagnero.com

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

Danziger Engineering Collaborative, Inc.
7402 McConnell Ave.
Los Angeles, CA 90045

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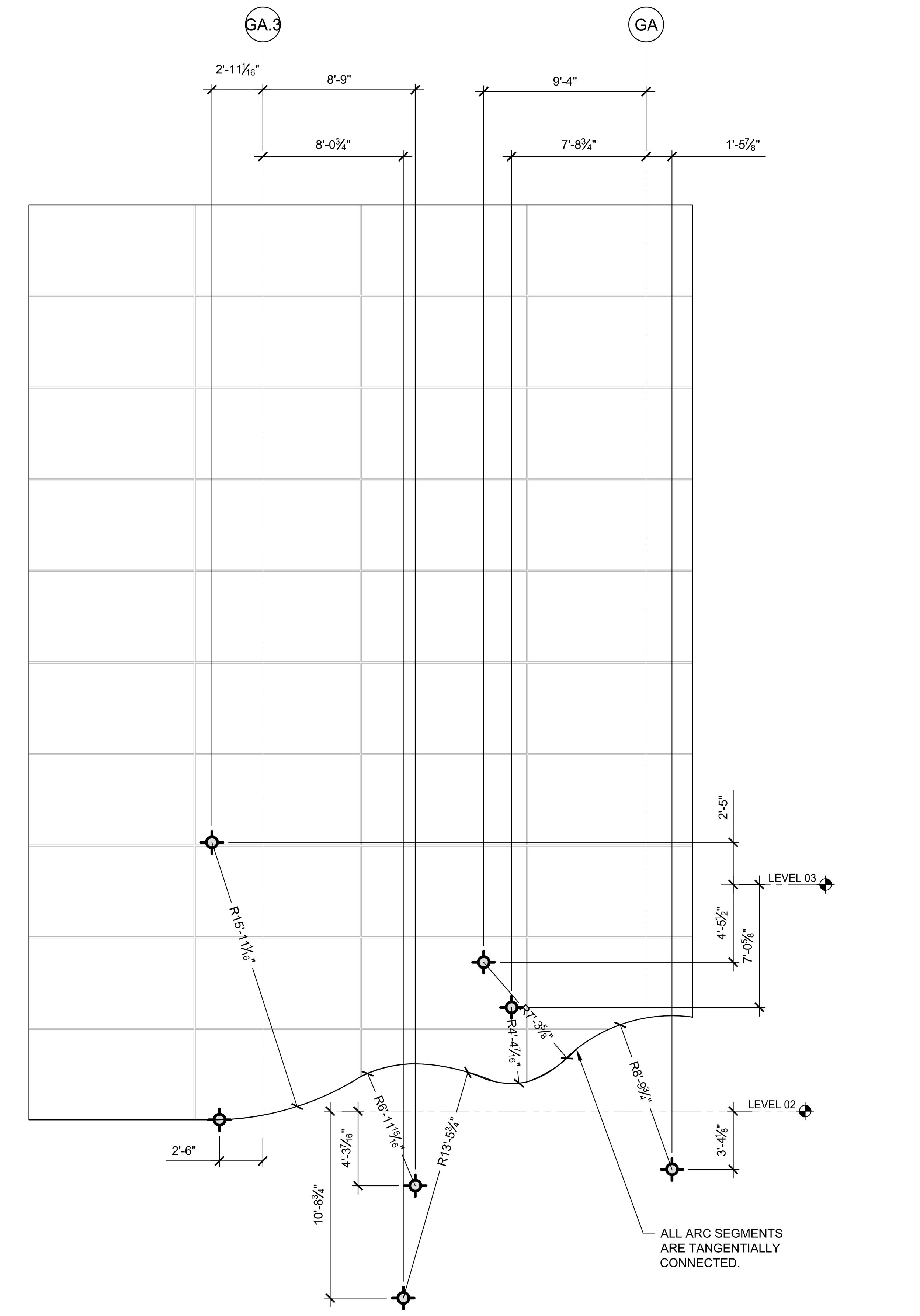
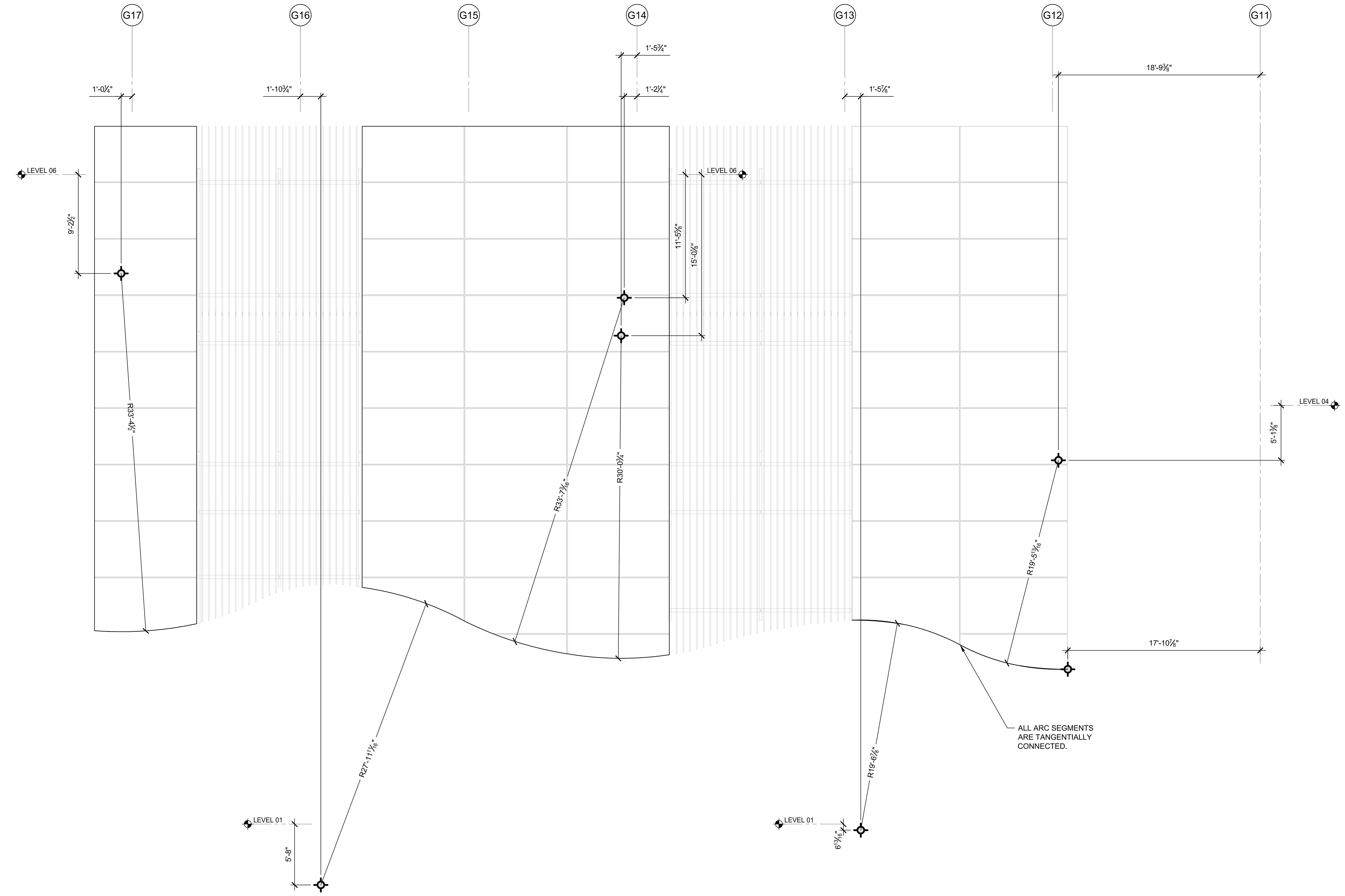
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

TRANSVERSE SECTION & CURVED PANEL ELEVATIONS



2 GLS3.3 NORTH ELEVATION 3/16" = 1'-0"



1 GLS3.3 WEST ELEVATION 3/16" = 1'-0"

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MARK CAVAGNERO ASSOCIATES ARCHITECTS
1045 Sansome Street, Suite 200 San Francisco, California 94111
T: 415.398.6944 F: 415.398.6943
www.cavagnero.com

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7402 McConnell Ave.
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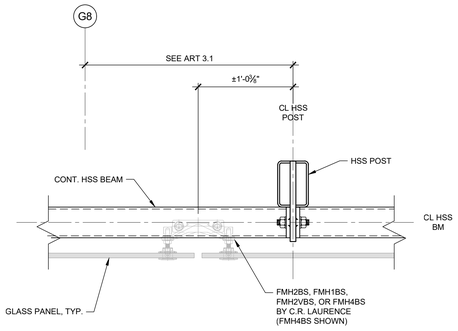
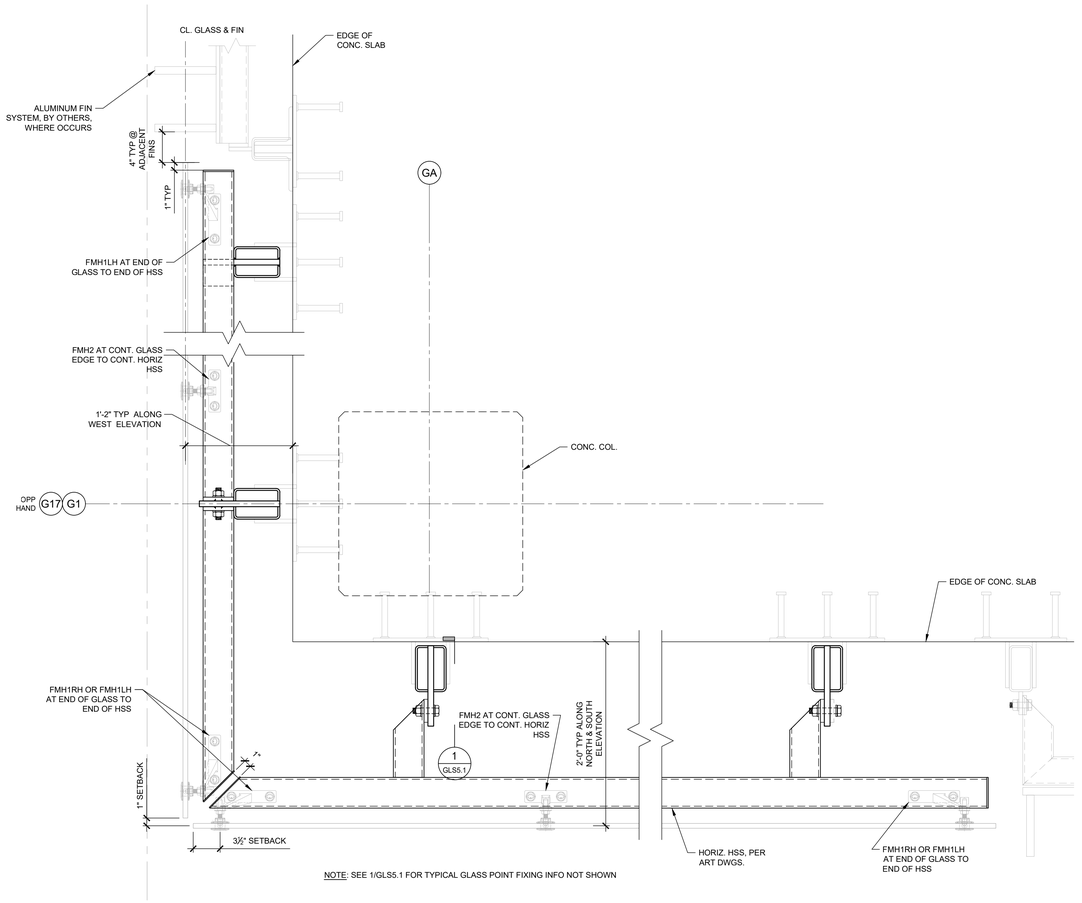
EXTERIOR ELEVATIONS BEAM CURVATURE

AS NOTED

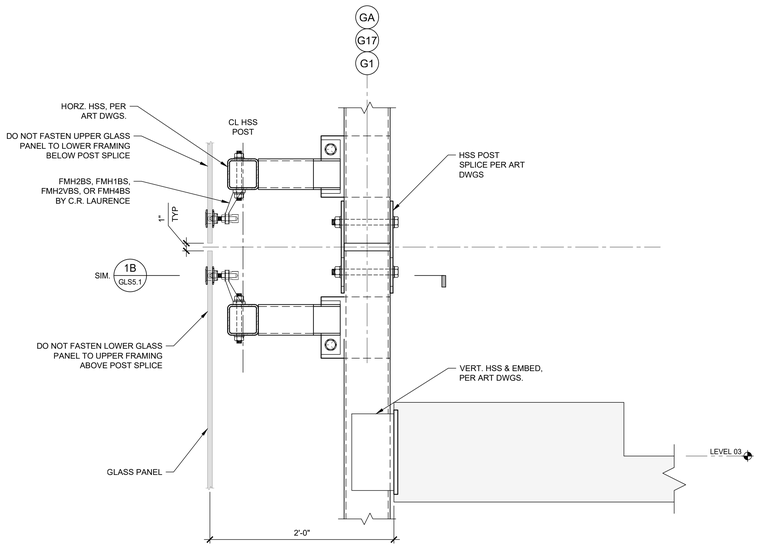
GLS3.3



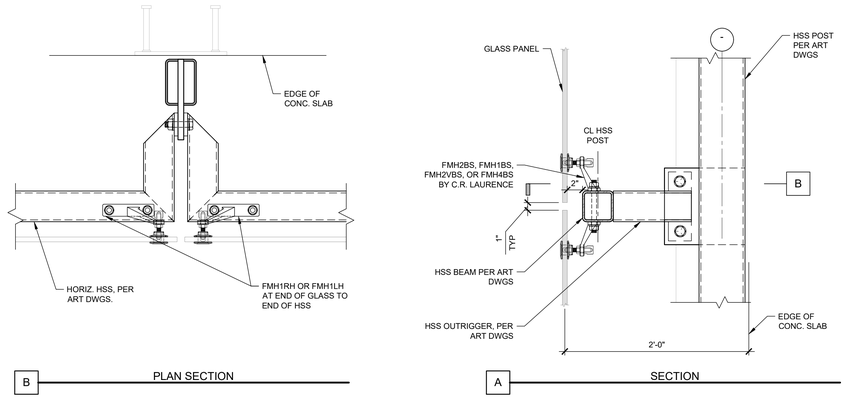
4 GLS5.1 GLASS PANEL POINT AT CONT. HSS BEAM NEAR GL G8 1-1/2" 1'-0"d



3 GLS5.1 PLAN VIEW AT SOUTHWEST CORNER (SIM AT NORTHWEST CORNER) 1-1/2" 1'-0"d



2 GLS5.1 TYP GLASS POINT AT POST SPLICE 1-1/2" 1'-0"d



1 GLS5.1 TYP GLASS POINT FIXING ATTACHMENT 1-1/2" 1'-0"d

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STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
3	2026.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

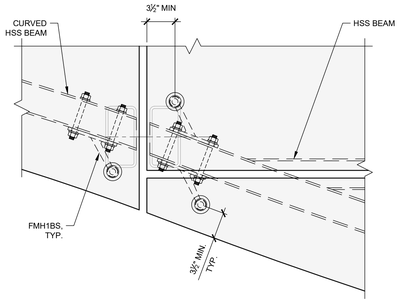
2000 MARIN STREET
SAN FRANCISCO, CA 94124

PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

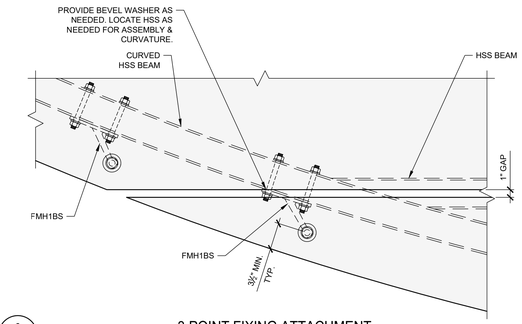
GLASS PANEL CONNECTION DETAILS

AS NOTED

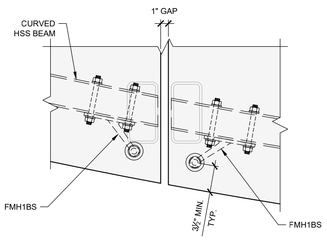
GLS5.1



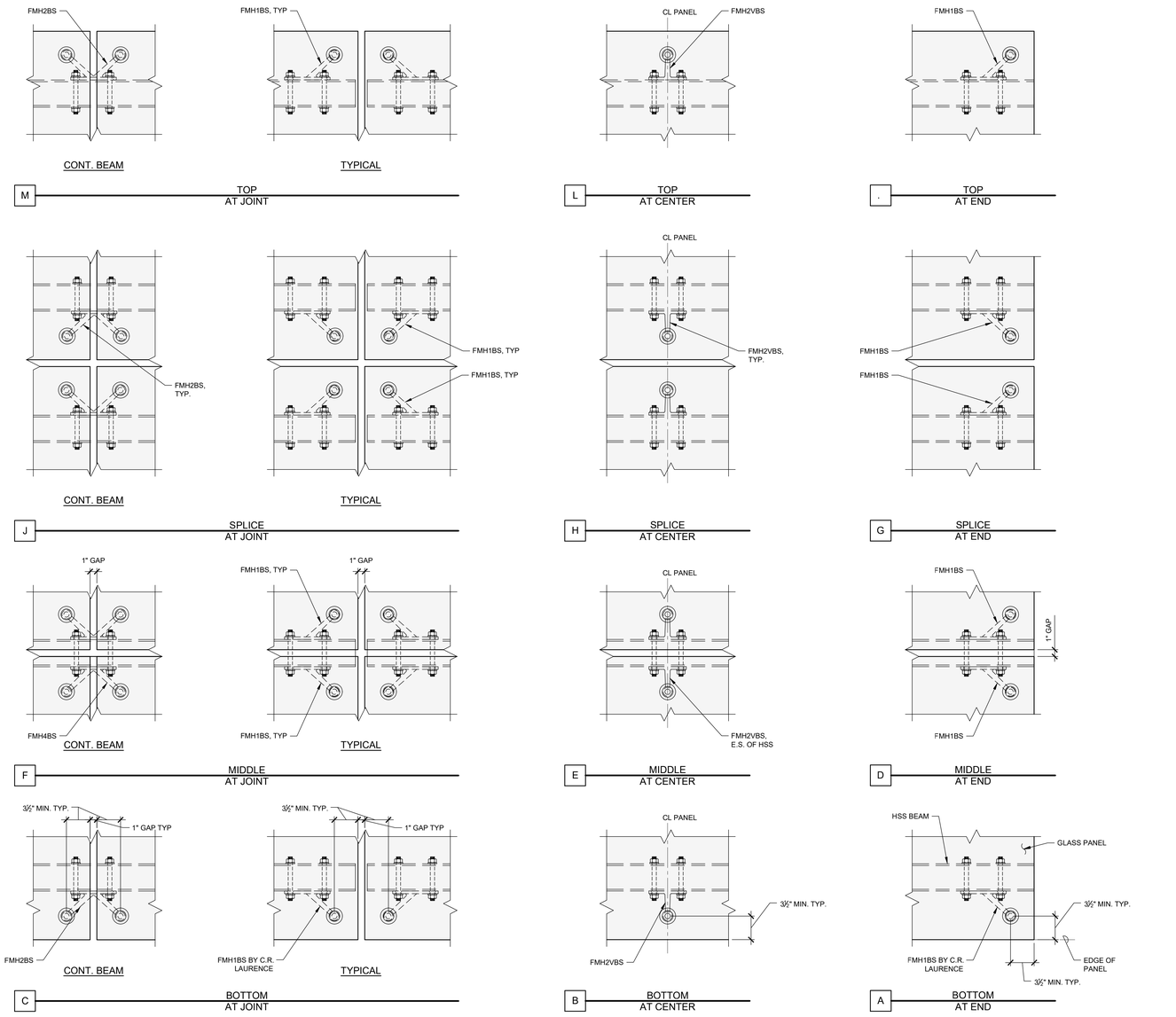
4 GLS5.2 — 3 POINT FIXING ATTACHMENT
B.O. SPECIAL CURVED PANEL — 1-1/2" = 1'-0"



3 GLS5.2 — 3 POINT FIXING ATTACHMENT
B.O. SPECIAL CURVED PANEL — 1-1/2" = 1'-0"



2 GLS5.2 — 2 POINT FIXING ATTACHMENT
B.O. SPECIAL CURVED PANEL — 1-1/2" = 1'-0"



1 GLS5.2 — TYPICAL GLASS POINT FIXING ATTACHMENT — 1-1/2" = 1'-0"

CAVAGNERO
MARK CAVAGNERO ASSOCIATES ARCHITECTS
1645 Sansome Street, Suite 201 T 415.398.6844
San Francisco, California 94111 F 415.398.6846
www.cavagnero.com

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

Danziger Engineering Collaborative, Inc.
7402 McConnell Ave.
Los Angeles, CA 90045

REGISTERED PROFESSIONAL ENGINEER
BRUCE EDWARD DANZIGER
S-4917
Exp. 9-30-27
STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
53	2026.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

2000 MARIN STREET
SAN FRANCISCO, CA 94124

PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2633
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

GLASS PANEL
CONNECTION DETAILS

AS NOTED

GLS5.2

STRUCTURAL ABBREVIATIONS

A
A.B.	ANCHOR BOLT
AC	ALASKA CEDAR (WOOD)
ABT	ABOUT
ABV	ABOVE
ADD'L	ADDITIONAL
ADJ.	ADJACENT
ALT.	ALTERNATE
AMP.	AMPLITUDE
AGGR.	AGGREGATE
APPROX.	APPROXIMATE(LY)
ARCH.	ARCHITECT(URE)(URAL)

B
BD	BOARD
BF	BRACED FRAME
B.F.	BOUNDARY FASTENER
B.L.	BOTTOM LOWER
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
B.N.	BOUNDARY NAIL(ING)
BOT.	BOTTOM
B.O.	BOTTOM OF
B.O.C.	BOTTOM OF CONCRETE
B.O.F.	BOTTOM OF FOOTING
B.O.S.	BOTTOM OF STEEL
BRG	BEARING
B.S.	BOTH SIDES
BSMT	BASEMENT
B.U.	BOTTOM UPPER
BTWN	BETWEEN

C
C	CHANNEL (STEEL SHAPE)
CFS	COLD-FORMED STEEL
CIDH	CAST-IN-DRILLED HOLE
C.I.P.	CAST-IN-PLACE
C.J.	CONSTRUCTION JOINT
C.J.P.	COMPLETE JOINT PENETRATION (GROOVE WELD)
CLG	CEILING
CLR	CLEAR, CLEARANCE
C.M.U.	CONCRETE MASONRY UNIT
COL.	COLUMN
COLL.	COLLECTOR
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCT(ING)(ION)
CONT.	CONTINUOUS
CONTR.	CONTRACT(OR)
CRVD.	CURVED
C.P.	COMPLETE PENETRATION (WELD)
CST.	CONSTRUCTION
CTR	CENTER, CENTRAL
CTSK	COUNTERSINK
CWT	COUNTERWEIGHT
CVN	CHARPY V-NOTCH

D
d	PENNY WEIGHT (NAIL)
D2L	NELSON WELDED REBAR
D.B.A.	DEFORMED BAR ANCHOR
DBL	DOUBLE
DEMO.	DEMOLITION
DTL	DETAIL
DF	DOUGLAS FIR (WOOD)
DIA.	DIAMETER
DIAG.	DIAGONAL
DIM.	DIMENSION
DISCONT.	DISCONTINUOUS
DN	DOWN
DO	DITTO
DP	DEEP
DWG	DRAWING

E
(E)	EXISTING
EA.	EACH
E.F.	EACH FACE
E.G.	SUCH AS
EL.	ELEVATION
ELEC.	ELECTRICAL
ELEVR	ELEVATOR
E.J.	EXPANSION JOINT
EMBED.	EMBEDMENT
E.N.	EDGE NAIL(ING)
E.O.	EDGE OF
E.O.S.	EDGE OF SLAB
E.P.S.	EXPANDED POLYSTYRENE
EQ.	EQUAL (EQUIVALENT)
EQ. SP.	EQUALLY SPACED
EQUIP.	EQUIPMENT
E.S.	EACH SIDE
E.W.	EACH WAY
E.W.E.F.	EACH WAY, EACH FACE
E/W	EAST/WEST
EXP.	EXPANSION
EXT.	EXTERIOR

F
FB	FLAT BAR (STEEL SHAPE)
F.D.	FLOOR DRAIN
FDN	FOUNDATION
F.F.	FAR FACE OR FIELD FASTENER
FIN.	FINISH(ED)
FLG.	FLANGE
FLR	FLOOR
F.N.	FIELD NAIL
F.O.	FACE OF
F.O.C.	FACE OF CONCRETE
F.O.S.	FACE OF STUD OR FACE OF STEEL
F.P.	FULL PENETRATION (WELD)
FPRF.	FIREPROOFING
FRMG	FRAMING
F.S.	FAR SIDE
FT	FEET OR FOOT
FTG.	FOOTING

G
ga	GAUGE
GALV.	GALVANIZED
GAR.	GARAGE
G.B.	GRADE BEAM
G.C.	GENERAL CONTRACTOR
GEN.	GENERAL
GLB	GLUED LAMINATED TIMBER BEAM
GLC	GLUED LAMINATED TIMBER COLUMN
GR.	GRADE
GYP.	GYPSUM

H
(H), HORIZ.	HORIZONTAL
H.C.T.	HOLLOW CLAY TILE
HD	HOLDOWN
H.D.G.	HOT-DIP GALVANIZED
HDPE	HIGH-DENSITY POLYETHYLENE
HDR	HEADER
HGR	HANGER
HK	HOOK
H.S.	HEADED STUD OR HIGH STRENGTH (BOLT)
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT

I
I.D.	INSIDE DIAMETER
I.E.	THAT IS, SPECIFICALLY
I.F.	INSIDE FACE
IN.	INCH
INCL.	INCLUDED
INFO.	INFORMATION
INSP.	INSPECTION
INSUL.	INSULATION
INT.	INTERIOR
IRREG.	IRREGULAR

J
JCT.	JUNCTION
JST	JOIST
JT, JNT	JOINT

K
K	KIP (1,000 POUNDS)
K.D.	KILN DRIED
KSI	KIPS PER SQUARE INCH
KSF	KIPS PER SQUARE FOOT

L
L	ANGLE (STEEL SHAPE)
LB.	POUND
LGS	LIGHT-GAUGE STEEL
L.L.B.B.	LONG LEGS BACK TO BACK
L.L.H.	LONG LEG HORIZONTAL
L.L.V.	LONG LEG VERTICAL
LMBR	LUMBER
L.S.	LONG SLOTTED (HOLE)
LSL	LAMINATED STRAND LUMBER
LSLH	LONG SLOTTED (HOLE) W/ LONG AXIS HORIZ.
LSLT.	LONG SLOTTED (HOLE)
LSLV	LONG SLOTTED (HOLE) W/ LONG AXIS VERT.
LTWT	LIGHTWEIGHT
LVL	LEVEL OR LAMINATED VENEER LUMBER
LWC	LIGHTWEIGHT CONCRETE

M
MANUF.	MANUFACTURER
MATL	MATERIAL
MAX.	MAXIMUM (NO MORE THAN; AT MOST)
M.B.	MACHINE BOLT
MC	MISCELLANEOUS CHANNEL (STEEL SHAPE)
MECH.	MECHANICAL
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MEZZ.	MEZZANINE
MF	MOMENT FRAME
MFR	MANUFACTURE(R)
M.I.	MALLEABLE IRON
MIN.	MINIMUM (NO LESS THAN; AT LEAST)
MISC.	MISCELLANEOUS
MOD.	MODIF(Y)(ICATION)
MT	MISCELLANEOUS TEE (STEEL SHAPE)
MTL	METAL

N
N	NORTH
(N)	NEW
N/A	NOT APPLICABLE
N.F.	NEAR FACE
N.I.C.	NOT IN CONTRACT
NO.	NUMBER
NOM.	NOMINAL
N&FS	NEAR & FAR SIDE
N.T.S.	NOT TO SCALE
NR	NEAR
N.S.	NEAR SIDE
N/S	NORTH/SOUTH
N.W.	NORMAL WEIGHT
NWC	NORMAL WEIGHT CONCRETE

O
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.F.	OUTSIDE FACE
OG	OPEN GRAIN (REDWOOD)
O.H.	OPPOSITE HAND
OP'G	OPENING
OPNG	OPENING
OPP.	OPPOSITE
ORIG.	ORIGINAL
O.S.	OVERSIZED (HOLE)

P
P.A.F.	POWDER ACTUATED FASTENER(S)
PC, PCS	PIECE, PIECES
PCF	POUNDS PER CUBIC FOOT
PCI	POUNDS PER CUBIC INCH
P.D.	POWDER DRIVEN
P.D.F.	POWDER DRIVEN FASTENER(S)
P.E.F.	(PLYWOOD) PANEL EDGE FASTENER
P.E.N.	(PLYWOOD) PANEL EDGE NAILING
PERF.	PERFORATED
PIPE-X	EXTRA STRONG PIPE
PIPE-XX	DOUBLE EXTRA STRONG PIPE
P.J.P.	PARTIAL JOINT PENETRATION (GROOVE WELD)
PL	PLATE
P.L.	PROPERTY LINE
PLWD.	PLYWOOD
PLYW'D	PLYWOOD
P.P.	PARTIAL PENETRATION (WELD)
PREFAB.	PREFABRICATE(D)
PRELIM.	PRELIMINARY
PRESTR.	PRESTRESSED
PREV.	PREVIOUS(LY)
PROJ.	PROJECT(ED)(ING)(ION)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PT	POINT
P.T.	POST-TENSION(ED)(ING)

R
(R)	REUSED
RAD.	RADIUS
RB	ROUND BAR (STEEL SHAPE)
R.C.	REINFORCED CONCRETE
REINF.	REINFORC(ED)(ING)
REBAR	REINFORCING BAR
REF.	REFERENCE
REQ'D	REQUIRED
RET.	RETAINING
REV.	REVIS(E)(ION)
RF	ROOF
RFG	ROOFING
RND	ROUND
R.O.	ROUGH OPENING
RW	REDWOOD

S
S.A.D.	SEE ARCHITECTURAL DRAWINGS
S.B.	SOLID BLOCKING
S.C.D.	SEE CIVIL DRAWINGS
SCHED.	SCHEDULE
SECT.	SECTION
S.E.D.	SEE ELECTRICAL DRAWINGS
SEP.	SEPARATION
SFHCS	SOCKET FLAT HEAD CAP SCREW
SHT	SHEET
SHTG	SHEATHING
SIM.	SIMILAR
S.L.B.B.	SHORT LEGS BACK TO BACK
S.L.D.	SEE LANDSCAPE DRAWINGS
SLRS	SEISMIC LOAD RESISTING SYSTEM
S.M.D.	SEE MECHANICAL DRAWINGS
S.M.S.	SHEET METAL SCREW
S.O.G.	SLAB ON GRADE
SP	SOUTHERN PINE (WOOD)
SPC.	SPAC(ES)(ING)
S.P.D.	SEE PLUMBING DRAWINGS
SPEC(S).	SPECIFICATION(S)
SQ.	SQUARE
S.S.	STAINLESS STEEL
S.S.	SHORT SLOTTED (HOLE)
SSLT.	SHORT SLOTTED (HOLE)
ST	AMERICAN STANDARD TEE (STEEL SHAPE)
STAG.	STAGGER(ED)
STAGG.	STAGGER(ED)
STD	STANDARD
STFNR.	STIFFENER
STL	STEEL
STRUC.	STRUCTURAL
SUP.	SUPPORT
SUSP.	SUSPENDED
SYM., SYMM.	SYMMETRICAL

T
T&B	TOP & BOTTOM
T&G	TONGUE & GROOVE
T.B.D.	TO BE DETERMINED
TD	TIE DOWN
THD	THREADED
THK	THICK(NESS)
THRD	THREADED
THRU	THROUGH
T.L.	TOP LOWER
T.N.	TOE NAIL
T.O.	TOP OF
T.O.C.	TOP OF CONCRETE ELEVATION
T.O.F.	TOP OF FOOTING
T.O.S.	TOP OF STEEL
TS	TUBE STEEL
T.U.	TOP UPPER
TYP.	TYPICAL

U
U.O.N.	UNLESS OTHERWISE NOTED
URM	UNREINFORCED MASONRY

V
(V), VERT.	VERTICAL
VOL.	VOLUME
V.I.F.	VERIFY IN FIELD
V.W.M.	VERIFY W/ MANUF.

W
W/	WITH
WD	WOOD
WF	WIDE FLANGE
W.H.	WEB HORIZONTAL
W/IN	WITHIN
WKG	WORKING
W.O.	WHERE OCCURS
W/O	WITHOUT
W.P.	WORK POINT
WPFG	WATERPROOFING
WT	WIDE-FLANGE TEE (STEEL SHAPE)
WT.	WEIGHT
W.W.F.	WELDED WIRE FABRIC

X
XS	EXTRA STRONG (PIPE)
XXS	DOUBLE EXTRA STRONG (PIPE)

SPECIAL CHARACTERS
&	AND
@	AT
CL	CENTER LINE
Ø	DIAMETER OR ROUND
//	PARALLEL
PL	PLATE, PROPERTY LINE
#	POUND OR NUMBER
±	TOLERANCE

OTHER ABBREVIATIONS (PRODUCT ABBREVIATIONS):

FOR WOOD FRAMING FASTENER AND CONNECTOR ABBREVIATIONS, SEE SIMPSON STRONG-TIE WOOD CONSTRUCTION CONNECTORS CATALOG (available at www.strongtie.com).

FOR POWDER-DRIVEN FASTENERS AND CONCRETE ANCHOR ABBREVIATIONS, SEE HILTI NORTH AMERICAN PRODUCT TECHNICAL GUIDE (available at www.us.hilti.com) AND SIMPSON STRONG-TIE ANCHOR SYSTEMS CATALOG (available at www.strongtie.com).

FOR LIGHT-GAUGE STEEL CONNECTOR ABBREVIATIONS, SEE STEEL NETWORK LIGHT STEEL FRAMING CONNECTION CATALOG (available at www.steelnetwork.com) AND SIMPSON STRONG-TIE COLD-FORMED STEEL CONNECTORS CATALOG (available at www.strongtie.com).

FOR ENGINEERED WOOD PRODUCT ABBREVIATIONS, SEE iLEVEL CATALOG (available at www.ilevel.com), LP BUILDING PRODUCTS CATALOG (available at www.lpcorp.com), REDBUILT CATALOG (available at www.redbuilt.com), AND STANDARD STRUCTURES, INC., CATALOG (available at www.standardstructures.com)

"THRD STUD" INDICATES FULL FUSION WELDED STUD PER SPECIFICATION SECTION 05 12 00.

SPECIAL INSPECTION AND STRUCTURAL OBSERVATION

A COPY OF THIS DOCUMENT SHALL BE KEPT WITH THE APPROVED STRUCTURAL DRAWING SET

JOB ADDRESS 2000 Marin St ____ APPLICATION NO.____ ADDENDUM NO.___

OWNER NAME ____ OWNER PHONE NO. ____

Employment of Special Inspection is the direct responsibility of the OWNER, or the engineer/architect of record acting as the owner's representative. Special inspector shall be one of those as prescribed in Sec. 1704. Name of special inspector shall be furnished to DBI District Inspector prior to start of the work for which the Special Inspection is required. Structural observation shall be performed as provided by Section 1704.6. A preconstruction conference is recommended for owner/builder or designer/builder projects, complex and highrise projects, and for projects utilizing new processes or materials.

In accordance with Chapter 17 (SFBC), Special Inspection and/or testing is required for the following work:

1. [ ] Concrete (Placement & sampling)
2. ■ Bolts installed in concrete
3. [ ] Special moment - Resisting concrete frame
4. [ ] Reinforcing steel and prestressing tendons
5. **Structural welding:**
   A. Periodic visual inspection
   ■ Single pass fillet welds 5/16" or smaller
   [ ] Steel deck
   ■ Welded studs
   [ ] Cold formed studs and joists
   [ ] Stair and railing systems
   [ ] Reinforcing steel
   B. Continuous visual inspection and NDT (Section 1704)
   ■ All other welding (NDT exception: Fillet weld)
   [ ] Reinforcing steel; and [ ] NDT required
   [ ] Moment-resisting frames
   [ ] Others____
6. [ ] High-strength bolting
7. [ ] Structural masonry
8. [ ] Reinforced gypsum concrete
9. [ ] Insulating concrete fill
10. [ ] Sprayed-on fireproofing
11. [ ] Piling, drilled piers and caissons
12. [ ] Shotcrete
13. [ ] Special grading, excavation and filling (Geo. Engineered)
14. [ ] Smoke-control system
15. [ ] Demolition
16. [ ] Exterior Facing
17. **Retrofit of unreinforced masonry buildings:**
    [ ] Testing of mortar quality and shear tests
    [ ] Inspection of repointing operations
    [ ] Installation inspection of new shear bolts
    [ ] Pre-installation inspection for embedded bolts
    [ ] Pull/torque tests per SFBC Sec.1607C & 1615C
18. **Bolts Installed in existing concrete or masonry:**
    [ ] Concrete [ ] Masonry
    [ ] Pull/torque tests per SFEBC Sec. 507C & 515C
19. [ ] Shear walls and floor systems used as shear diaphragms
20. [ ] Holdowns
21. **Special cases:**
    [ ] Shoring
    [ ] Underpinning: [ ] Not affecting adjacent property
    [ ] Affecting adjacent property: PA____
    [ ] Others
22. [ ] Crane safety (Apply to the operation of tower cranes on high-rise building) (Section 1705.22)
23. [ ] Others: "As recommended by professional of record" ____

24. **Structural observation per Sec. 1704.6 (SFBC) for the following:** [ ] Foundations ■ Steel framing [ ] Concrete construction [ ] Masonry construction [ ] Wood framing [ ] Other: ____

25. Certification is required for: [ ] Glu-lam components
26. [ ] Firestops in high-rise building

Prepared by: Tipping Structural Engineers Attn: David Ng Phone: (510) 549-1906
Engineer/Architect of Record

Required information:
FAX: (N/A) ____ Email: d.ng@tippingstructural.com

Review by: ____ Phone: (628) 652-____
DBI Engineer or Plan Checker

****

APPROVAL (Based on submitted reports.)

____
DATE DBI Engineer or Plan Checker / Special Inspection Services Staff

QUESTIONS ABOUT SPECIAL INSPECTION AND STRUCTURAL OBSERVATION SHOULD BE DIRECTED TO:
Special Inspection Services (628) 652-3407; or, dbi.specialinspections@sfgov.org

STRUCTURAL DRAWING SHEET INDEX

SCOPE OF STRUCTURAL WORK:

These ART drawings describe the structural steel armature designed to support glass art panels mounted to three exterior elevations of a new concrete parking garage. This work includes steel embed plates cast into the concrete structure for attachment of steel armature elements.
See GLS sheets for information about glass panels and point supported glass fixing hardware. See drawings by Watry Design Inc. for information about concrete structure.

STRUCTURAL NOTES

DIVISION 01: GENERAL CONDITIONS

SECTION A: GENERAL REQUIREMENTS

1. These notes apply to all drawings and govern unless otherwise noted. All work shall conform to the 2022 California Building Code, as modified by state and local jurisdiction.
2. These structural drawings are copyrighted instruments of service of Tipping, for sole use for this project. Tipping CAD files may only be used as backgrounds for shop drawings after Tipping receives a signed waiver from each party using the files, addressing the limitations and proper use of these CAD files.
3. Verify all existing conditions and proposed dimensions at the job site. Compare structural drawings with architectural, mechanical, and electrical and plumbing drawings before commencing work. Notify Architect of any discrepancies and do not proceed with affected work until they are resolved. Do not scale drawings.
4. Unless otherwise shown or noted, all typical details shall be used where applicable. All details shall be considered typical at similar conditions.
5. Unless otherwise shown or noted, install, test, and inspect manufactured structural products in accordance with manufacturer's recommendations and applicable evaluation service reports.
6. The Contractor and Special Inspector shall contact the Structural Engineer regarding any questions of interpretation of these specifications and drawings.
7. Submittal Protocol:
   1. Shop drawings, design-build calculations, and product data shall be submitted to, and reviewed by, General Contractor, Architect, and Engineer before fabrication. All submittals shall have a clear 3.5-inch by 7-inch space reserved for shop drawing stamps by General Contractor, Architect and Engineer. If submitted sheets do not have sufficient room, a cover sheet with a table of contents and sufficient space for stamps may be submitted.
   2. Each shop drawing submittal to the Engineer shall be submitted electronically:
      1. Except for mock-ups, samples, and as otherwise specified, all submittals to be in electronic form (Adobe Portable Document Format).
   3. Submit shop drawings well in advance of fabrication; allow at least three weeks for engineering review, and additional time for review and forwarding by Architect and General Contractor, and for revisions and re-submittal, if required.
   4. Shop drawings and welding procedure submittals shall be dated, and each update shall be identified with a unique revision number. All items on the shop drawings that vary from the Structural Drawings, alter structural details, or extrapolate from similar details, shall be circled by a cloud with the note "Engineer Verify."
   5. Once reviewed, shop drawings and product data shall not be changed, nor shall construction operations be deviated from, unless resubmitted and reviewed again. Review of shop drawings that contain deviations from Contract Documents shall not constitute acceptance of such deviations, unless specifically authorized by the Architect.
   6. Submittal review is of a general nature only, and responsibility for conformance with drawing intent shall remain with the Contractor. Review does not imply or state that Contractor has correctly interpreted the Contract Documents.
   7. Satisfactory review of shop drawings and product data must be obtained prior to fabrication or delivery of material to the site. The following items shall be submitted:
      1. Structural steel & connections shop drawings.
      2. Written Weld Procedure Specifications (WPS) and manufacturer's electrode data sheets (submit to testing lab for approval, copy to Structural Engineer).
      3. Structural drawings and calculations for all shoring and bracing of soil, and of existing and new structures, where needed to adequately support imposed vertical and lateral loads. These submittals are for information-only.
8. Safety Measures:
   1. At all times, Contractor shall be solely and completely responsible for job site conditions including safety of people and property, and for all necessary independent engineering reviews of these conditions.
   2. Install shoring and bracing of soil, and of existing and new structures, where necessary to adequately support imposed vertical and lateral loads. Maintain shoring and bracing until the new structure can support the anticipated loads.
   3. Engineer's job site visits are not intended to include review of adequacy of Contractor's safety measures.
9. Any openings, holes, cuts or discontinuities not shown on the structural drawings and extending into or through structural elements require Engineer's prior approval and may require special structural detailing. Existing concrete slab reinforcing outside of areas specifically called for demolition may not be cut without Engineer's prior approval.
10. Survey of Structure: Before preparing steel shop drawings, Contractor shall survey the building to locate all existing floor elevations, column centerlines, and interior and exterior face of wall, in order to locate new steel elements.

SECTION B: STRUCTURAL TESTING, INSPECTION, AND OBSERVATION

1. Provide tests and inspections for all items as required by the California Building Code and all applicable local ordinances.
2. The Owner shall retain an independent testing agency to perform all required testing and inspections.
3. The Contractor is responsible for coordinating with Owner's Testing Agency and Special Inspector to schedule all required tests and inspections.
4. The following specific items shall be inspected and/or tested by the testing lab:
   1. Bolts and embedded items installed into concrete.
   2. All structural welding. All complete penetration welds shall be non-destructively tested by ultrasonic or radiographic methods unless otherwise noted in drawings.
   3. Headed shear stud placement and welding.
   4. All bolted connections, including special requirements for high strength bolting.
5. Structural Observation: In addition to inspection by Special Inspector, Structural Engineer will review construction for general conformance with Structural Drawings. Contractor shall notify Structural Engineer at least five working days prior to concealing any structural items. Structural Engineer will then determine if a site visit is appropriate. Notification shall include the following items:
   1. Embedded items, prior to concrete placement.
   2. Structural framing.

SECTION C: STRUCTURAL DESIGN BASIS

1. Construct in conformance with the 2022 California Building Code and all applicable local ordinances.
2. Design vertical loads:

	DL (psf)	LL
Glass Panel:	16	200lbs Point Load

3. Design lateral loads are based on the following criteria:
   1. Risk Category: III
   2. Wind
      1. Basic Wind Speed: 99 mph (3-second gust)
      2. Exposure Category: B
      3. Importance Factor, Iw: 1.00
      4. Gcp: 1.40
      5. Gcpi: 0.55
      6. Cladding Pressure: 35.3 psf
   3. Seismic
      1. Importance Factor, Ie:1.25
      2. S-s: 1.5 g (0.2 sec site specific response)
      3. S-1: 0.6 g (1.0 sec site specific response)
      4. Site Soil Class: B
      5. S-ds: 0.9 g (0.2 sec site specific response)
      6. S-d1: 0.32 g (1.0 sec site specific response)
      7. SDC: D (Seismic Design Category)
      8. Fp: 0.72 g (Seismic Response Coefficient)
      9. Rp: 1.5 (Component Response Modification Factor)
      10. Ap: 1.0 (Component Amplification Factor)
      11. Analysis Procedure: Non-structural components Chap. 13 ASCE 07
4. The seismic load resisting system (SLRS) of the structure comprises the following elements described in the drawings:
   1. Bending in steel posts

SECTION D: DESIGN-BUILD CRITERIA

1. General:
   1. Submit shop drawings and structural calculations for all design-build items, stamped and signed by a California-licensed Civil or Structural Engineer.
2. Artwork Glass and Point Supported Glass Hardware to steel structures:
   1. Out-of-plane deflection shall not exceed L/175. Restrict deflection to ¾" (19mm) maximum for individual glass lites.

DIVISION 05: METALS

SECTION 05 12 00: STRUCTURAL STEEL AND MISCELLANEOUS IRON

1. Square or rectangular HSS shall conform to ASTM A500 Grade B (Fy = 46 ksi); ASTM A847 (Fy = 50 ksi) may be substituted.
2. Structural steel angles and miscellaneous iron shall conform to ASTM A36 (Fy = 36 ksi); ASTM A572 Grade 50 may be substituted.
3. Non-seismically loaded structural steel plates and bars:
   1. ASTM A36 (Fy = 36 ksi); ASTM A572 Grade 50 may be substituted.
4. Seismically loaded structural steel plates and bars:
   1. ASTM A572 Grade 50 with minimum CVN toughness at +70 degrees Fahrenheit, tested in accordance with ASTM A673 Frequency H:
      1. Thickness of 2 inches or less: 40 ft-lb.
5. Use ASTM A572 Grade 50 for typical threaded rods, and F1554 Grade 55 for threaded rods used as anchor bolts. ASTM A193 Grade B7 may be used in lieu of A449 or F1554 Grade 105.
   1. Threaded rod nuts and washers: Same as for machine bolts where A307 or A36 material is used otherwise use nuts as required by ASTM A490. Nuts to be heavy hex when embedded in concrete.
6. Unfinished (machine) bolt assemblies shall conform to ASTM A307 Grade A, with ASTM F844 washers (ANSI B18.23.1 if beveled).
7. Threaded studs and headed shear studs shall conform to AWS D1.1, and shall be carbon steel conforming to ASTM A108 grades 1010 through 1020 unless otherwise noted. Stud bases shall be full-fusion arc welded. Stud welding through metal deck and all other configurations shall be qualified through testing per AWS D1.1, Section 7.6-7.8. Where stainless steel studs are used, studs to be post-annealed as required to prevent brittle failure.
8. Any steel exposed to weather shall be hot-dip galvanized per ASTM A123 (steel fasteners per ASTM A153 or B695, Class 55), or weatherproofed by an approved equal.
9. All work shall be performed in accordance with:
   1. AISC 360, "Specification for Structural Steel Buildings" and
   2. AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," modified as follows:
      1. No provision of AISC 303 shall be effective to change the duties and responsibilities of the Owner, Contractor, Architect and Structural Engineer from those set forth in these Contract Documents.
      2. Reference to AISC 303 is made only to technical issues and excludes all issues related to schedule, Owner's responsibilities, approvals and commercial terms.
      3. Where discrepancies exist between the requirements of the Contract Documents and AISC 303, the requirements of the Contract Documents shall govern and the corresponding provision of AISC 303 shall be assumed as being deleted.
      4. Contrary to AISC 303 Section 4.1, issuance of structural design drawings for bid does not constitute a release for construction. Prior to proceeding with mill orders, shop drawings or fabrication, Contractor shall confirm with Owner, Architect and Structural Engineer which portions of the work have been released for construction.
10. Welding shall conform with the latest edition of the AWS D1.1 specifications and shall be done by certified welders. All electrodes shall be E70XX (70 ksi) unless otherwise noted on the drawings. Electrodes and fluxes shall be kept clean and dry per AWS D1.1 and the following additional requirements. FCAW (wire) electrodes shall be consumed within two weeks of opening their original packaging. Rusted electrodes shall be discarded. SMAW (stick) electrodes shall be low hydrogen type, shall have moisture-resistant coatings, and shall be used within 8 hours of opening their hermetically-sealed containers, or shall be redried per AWS D1.1, Section 4.5.2. SAW flux shall be kept clean and dry per AWS D1.1, Section 4.8.3. SAW flux open to air for more than two days shall be re-dried for at least two hours at between 500 and 900 degrees Fahrenheit. Wet flux shall be discarded.
11. All welding shall be performed in strict adherence to a written welding procedure specification (WPS) per AWS D1.1, Section 6.5.2. For each type of weld, a WPS shall be submitted to the testing laboratory for approval on AWS Form E-1 (see Appendix E of AWS D1.1). Supporting Procedure Qualification Records (PQR) shall be submitted for welds not pre-qualified by AWS D1.1. The WPS shall list both the AWS and Manufacturer's electrode designation. The Manufacturer's Electrode Data Sheets shall be submitted along with the WPS, and all welding parameters shall be within the electrode Manufacturer's Recommendations. Copies of the WPS shall be on site and available to all Welders and the Special Inspector.

DIVISION 08: GLASS AND GLASS HARDWARE

1. Artwork glass by PETERS STUDIO, or approved equal.
2. Glass Hardware (attachments and spider fittings) by C.R. LAURENCE or approved equal.
3. Glass attachment hardware to be confirmed by installer including compatibility with installation sequences and coordination with allowances for tolerances and movements (translations and rotations).
4. See "SFWD 2000 Marin SFAC Artwork Point Supported Glass Fabrication Specifications", "SFWD 2000 Marin SFAC Artwork Point Supported Glass Installation Specifications", and "San Francisco Arts Commission Artwork Coordination RFP" for additional requirements.

CAVAGNERO
MARK CAVAGNERO ASSOCIATES ARCHITECTS
1045 Sansome Street, Suite 200 T 415 398 6944
San Francisco, California 94111 F 415 398 6943
www.cavagnero.com

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

CONSULTANT
TIPPING
1906 Shattuck Avenue, Berkeley, CA 94704
510.549.1906 www.tippingstructural.com

REGISTERED PROFESSIONAL ENGINEER
MARC ANDREW STEYER
No. S6022
Exp. 9-30-26
STRUCTURAL
STATE OF CALIFORNIA

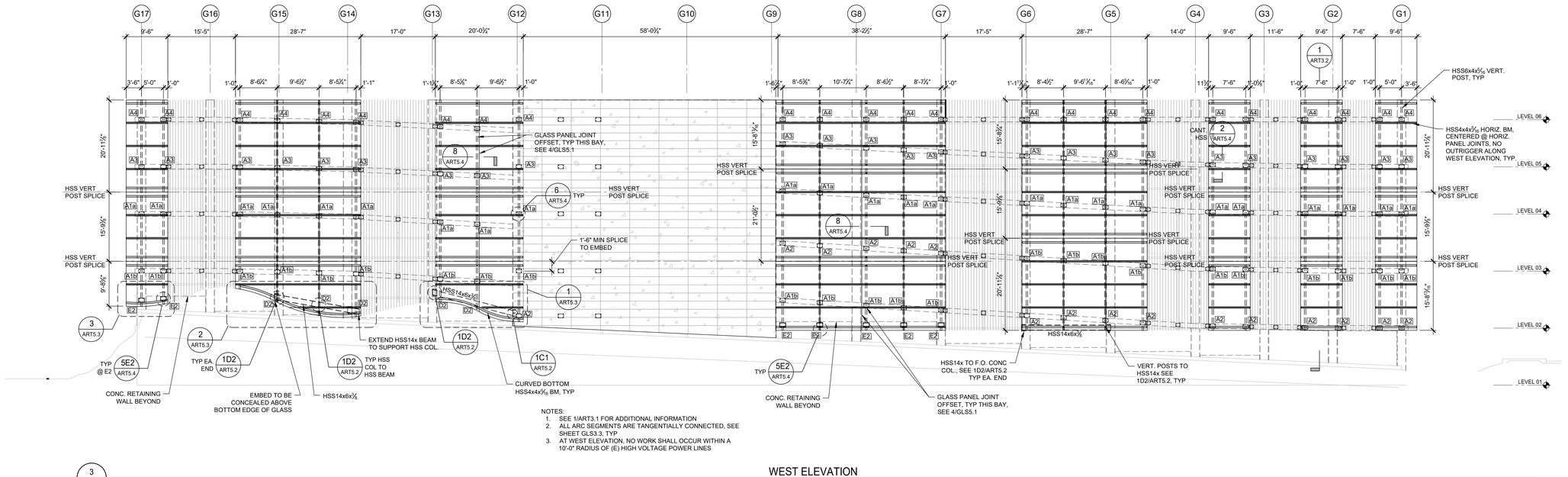
REV	DATE	DESCRIPTION
5	2024.06.26	BID PACKAGE NO. 1
	2024.09.13	50% CD SET
	2024.09.20	PROGRESS SET
	2024.10.16	BID + PERMIT SET
11	2024.12.10	75% CONSTRUCTION DOCUMENTS
16	2025.01.31	ADDENDUM NO.3
53	2026.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE
2000 MARIN STREET
SAN FRANCISCO, CA 94124
PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

STRUCTURAL ABBR., SHEET INDEX, SPECIAL INSPECTION CHECK LIST & GENERAL NOTES

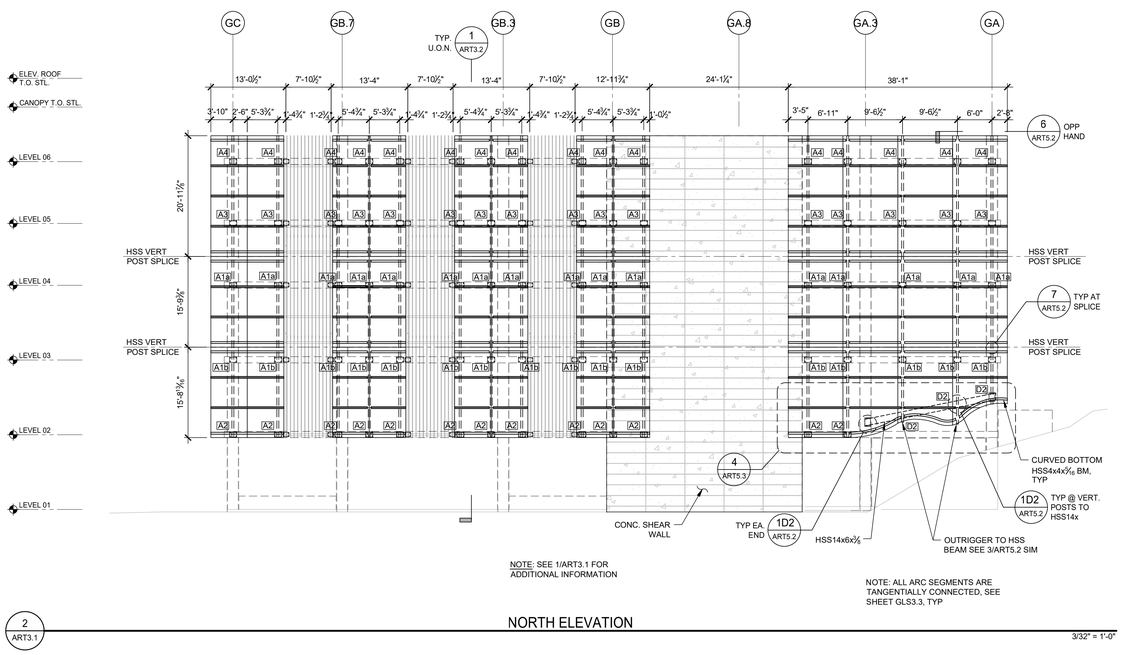
AS NOTED

ART1.1



NOTES:
1. SEE 1/ART3.1 FOR ADDITIONAL INFORMATION
2. ALL ARC SEGMENTS ARE TANGENTIALLY CONNECTED, SEE SHEET GLS3.3, TYP
3. AT WEST ELEVATION, NO WORK SHALL OCCUR WITHIN A 10'-0" RADIUS OF (E) HIGH VOLTAGE POWER LINES

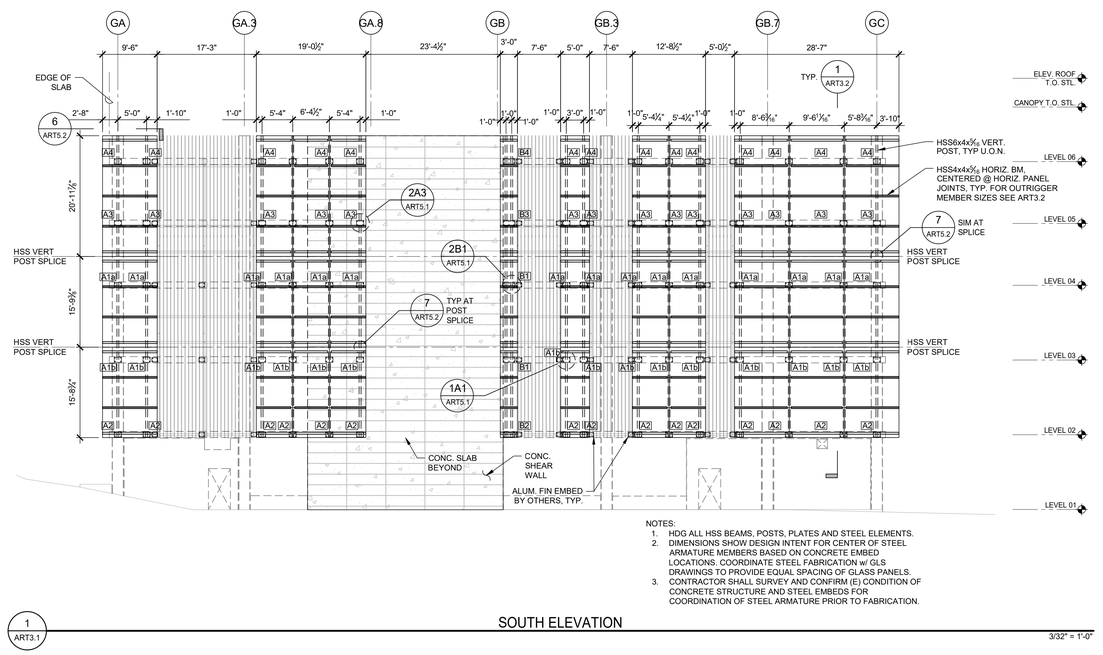
3 ART3.1 — WEST ELEVATION — 3/32" = 1'-0"



NOTE: SEE 1/ART3.1 FOR ADDITIONAL INFORMATION

NOTE: ALL ARC SEGMENTS ARE TANGENTIALLY CONNECTED, SEE SHEET GLS3.3, TYP

2 ART3.1 — NORTH ELEVATION — 3/32" = 1'-0"



NOTES:
1. HDG ALL HSS BEAMS, POSTS, PLATES AND STEEL ELEMENTS.
2. DIMENSIONS SHOW DESIGN INTENT FOR CENTER OF STEEL ARMATURE MEMBERS BASED ON CONCRETE EMBED LOCATIONS. COORDINATE STEEL FABRICATION w/ GLS DRAWINGS TO PROVIDE EQUAL SPACING OF GLASS PANELS.
3. CONTRACTOR SHALL SURVEY AND CONFIRM (E) CONDITION OF CONCRETE STRUCTURE AND STEEL EMBEDS FOR COORDINATION OF STEEL ARMATURE PRIOR TO FABRICATION.

1 ART3.1 — SOUTH ELEVATION — 3/32" = 1'-0"

CAVAGNERO
MARK CAVAGNERO ASSOCIATES ARCHITECTS
1645 Sansome Street, Suite 200 T 415.398.6844
San Francisco, California 94111 F 415.398.6845
www.cavagnero.com

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

TIPPING
1906 Shattuck Avenue, Berkeley, CA 94704
510.549.1906 www.tippingstructural.com

CONSULTANT

REGISTERED PROFESSIONAL ENGINEER
MARC ANDREW STECKER
No. S6022
Exp. 9-30-26
STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
	2024.06.26	BID PACKAGE NO. 1
5	2024.09.13	50% CD SET
	2024.09.20	PROGRESS SET
	2024.10.16	BID + PERMIT SET
11	2024.12.10	75% CONSTRUCTION DOCUMENTS
16	2025.03.14	ADDENDUM NO.3
53	2026.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

2000 MARIN STREET
SAN FRANCISCO, CA 94124

PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

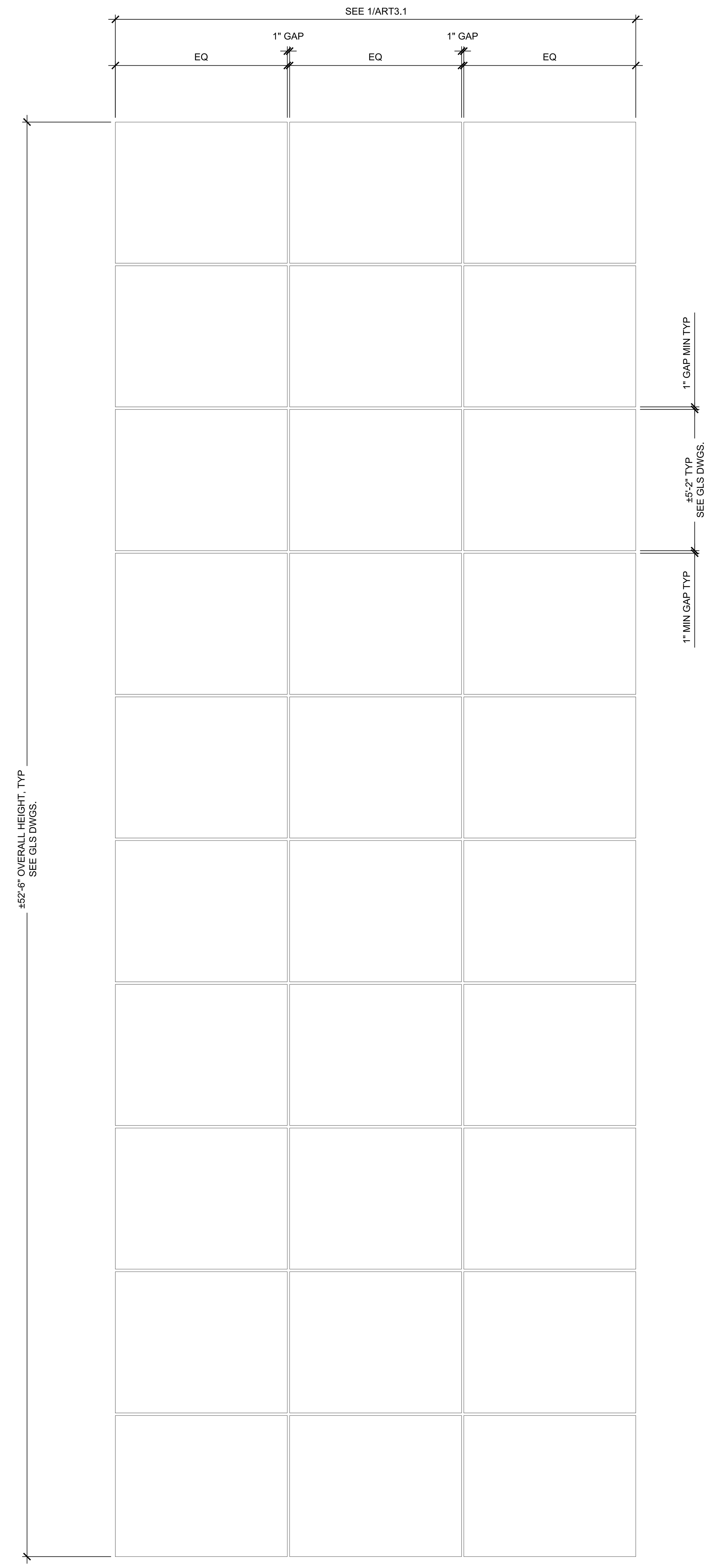
EXTERIOR ELEVATIONS GLASS PANEL SUPPORTS

KEY PLAN

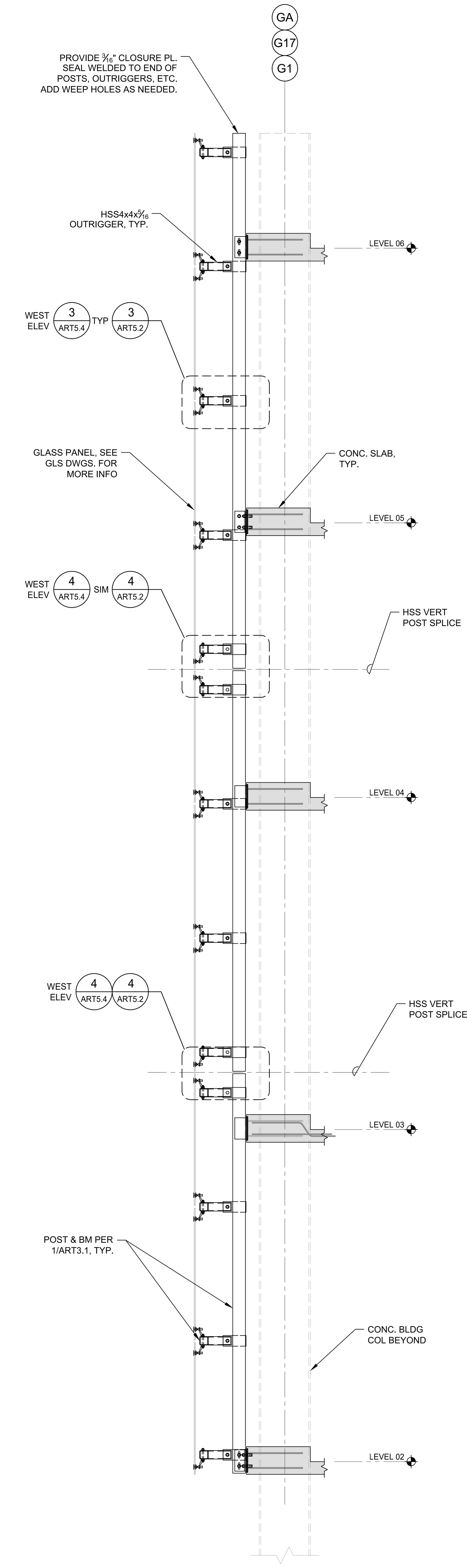
FOR DBI USE ONLY

AS NOTED

ART3.1



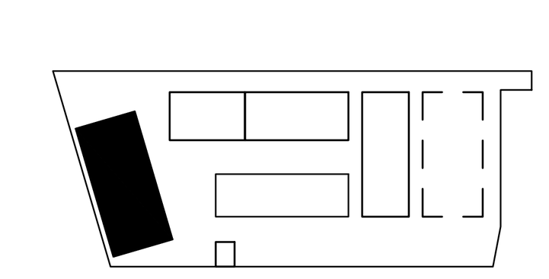
2 ART3.2 TYP GLASS PANEL ELEVATION 3/8" = 1'-0"



NOTE: FOR EMBED TYPE SEE ART3.1 & 1/ART5.1.

1 ART3.2 TYP TRANSVERSE SECTION 3/8" = 1'-0"

KEY PLAN



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MARK CAVAGNERO ASSOCIATES ARCHITECTS

San Francisco Water Power Sewer

TIPPING
1906 Shattuck Avenue, Berkeley, CA 94704
510.549.1906 www.tippingstructural.com

CONSULTANT

REGISTERED PROFESSIONAL ENGINEER
MARC ANDREW STEYER
No. S6022
Exp. 9-30-26
STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
5	2024.06.26	BID PACKAGE NO. 1
	2024.09.13	50% CD SET
	2024.09.20	PROGRESS SET
	2024.10.16	BID + PERMIT SET
11	2024.12.10	75% CONSTRUCTION DOCUMENTS
16	2025.01.31	ADDENDUM NO.3
53	2026.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

2000 MARIN STREET
SAN FRANCISCO, CA 94124

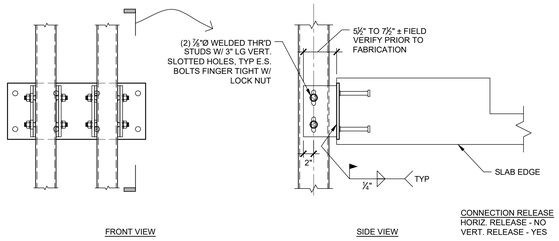
PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

TRANSVERSE SECTIONS

AS NOTED

ART3.2

Plotted: Friday, April 10, 2026 12:03:28 PM - By: kelso - Sheet Size: 30x42 - File: X:\2024dwgs\24070\struct\070ART3.2.dwg



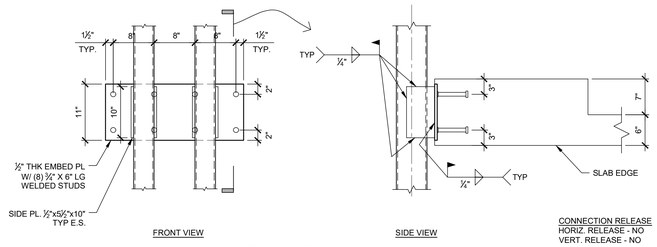
FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - NO; VERT. RELEASE - YES

NOTE: SEE B1 FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	130 LBS
	Mx	705 LBS-FT
	My	-
	Mz	315 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	2430 LBS
	Mx	1,136 LBS-FT
	My	1,205 LBS-FT
	Mz	-
SEISMIC	X - IN PLANE	820 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	-
	Mx	-
	My	770 LBS-FT
	Mz	2,178 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

B4 TYPE B4 - VERT SLIP



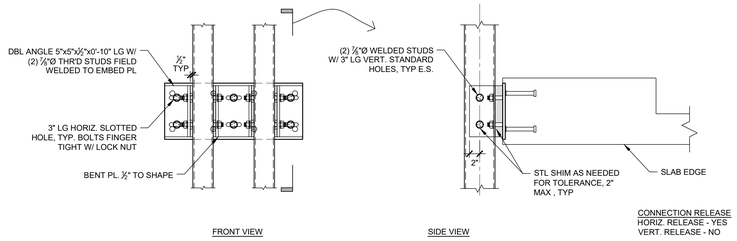
FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - NO; VERT. RELEASE - NO

NOTE: SEE A1a FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	1,810 LBS
	Z - OUT OF PLANE	-
	Mx	70 LBS-FT
	My	-
	Mz	330 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	3,415 LBS
	Mx	760 LBS-FT
	My	1,555 LBS-FT
	Mz	-
SEISMIC	X - IN PLANE	605 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	-
	Mx	-
	My	965 LBS-FT
	Mz	2,405 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

B1 TYPE B1 - TYPICAL EMBED



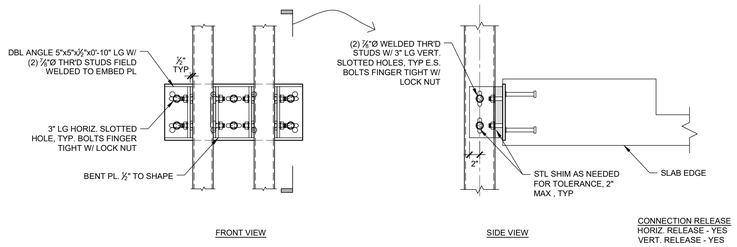
FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - YES; VERT. RELEASE - NO

NOTE: SEE B1 FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	2,385 LBS
	Z - OUT OF PLANE	-
	Mx	96 LBS-FT
	My	-
	Mz	370 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	2,265 LBS
	Mx	135 LBS-FT
	My	1,205 LBS-FT
	Mz	-
SEISMIC	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	-
	Mx	-
	My	750 LBS-FT
	Mz	2,995 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

B3 TYPE B3 - HORZ. SLIP



FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - YES; VERT. RELEASE - YES

NOTE: SEE B1 FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	135 LBS
	Mx	-
	My	-
	Mz	185 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	1,140 LBS
	Mx	-
	My	645 LBS-FT
	Mz	-
SEISMIC	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	-
	Mx	-
	My	400 LBS-FT
	Mz	225 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

B2 TYPE B2 - VERT & HORZ. SLIP

NOTE: HDG ALL HSS BEAMS, POSTS, PLATES AND STEEL ELEMENTS

EMBED AT DOUBLE COLUMN

2 ART5.1

1" 1'-0"d

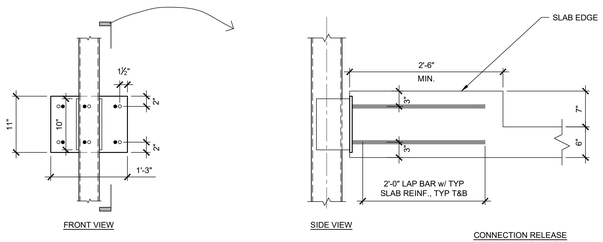
FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - NO; VERT. RELEASE - YES

NOTE: SEE A1a FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	405 LBS
	Mx	3,220 LBS-FT
	My	-
	Mz	-
WIND	X - IN PLANE	455 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	10,500 LBS
	Mx	8,640 LBS-FT
	My	185 LBS-FT
	Mz	480 LBS-FT
SEISMIC	X - IN PLANE	2,435 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	220 LBS
	Mx	240 LBS-FT
	My	1,190 LBS-FT
	Mz	5,990 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

A4 TYPE A4 - VERT SLIP



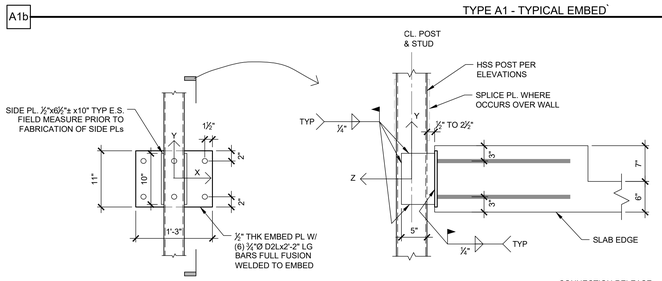
FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - NO; VERT. RELEASE - NO

NOTES:
1. SEE A1a FOR INFORMATION NOT NOTED.
2. ADD BARS MAY BE OMITTED WHERE PT TENDON ANCHORAGE OCCURS.

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	4,670 LBS
	Z - OUT OF PLANE	430 LBS
	Mx	1,525 LBS-FT
	My	-
	Mz	
WIND	X - IN PLANE	440 LBS
	Y - GRAVITY	80 LBS
	Z - OUT OF PLANE	12,240 LBS
	Mx	17,240 LBS-FT
	My	820 LBS-FT
	Mz	765 LBS-FT
SEISMIC	X - IN PLANE	1,695 LBS
	Y - GRAVITY	460 LBS
	Z - OUT OF PLANE	310 LBS
	Mx	230 LBS-FT
	My	1,210 LBS-FT
	Mz	5,735 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

A1b TYPE A1 - TYPICAL EMBED`



FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - NO; VERT. RELEASE - NO

NOTE: HDG ALL HSS BEAMS, POSTS, PLATES AND STEEL ELEMENTS

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	3,230 LBS
	Z - OUT OF PLANE	-
	Mx	495 LBS-FT
	My	-
	Mz	-
WIND	X - IN PLANE	400 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	10,250 LBS
	Mx	2,540 LBS-FT
	My	125 LBS-FT
	Mz	230 LBS-FT
SEISMIC	X - IN PLANE	1,190 LBS
	Y - GRAVITY	80 LBS
	Z - OUT OF PLANE	225 LBS
	Mx	
	My	1,060LBS-FT
	Mz	2,790 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

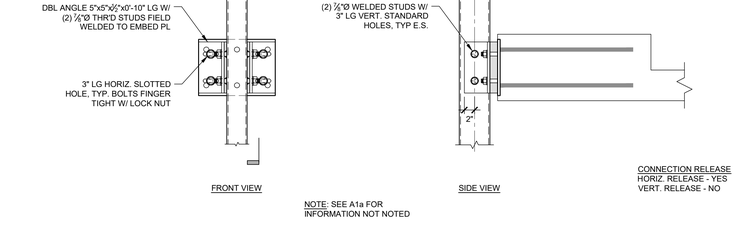
A1a TYPE A1a - TYPICAL EMBED

NOTE: HDG ALL HSS BEAMS, POSTS, PLATES AND STEEL ELEMENTS

EMBED PLATE

1 ART5.1

1" 1'-0"d



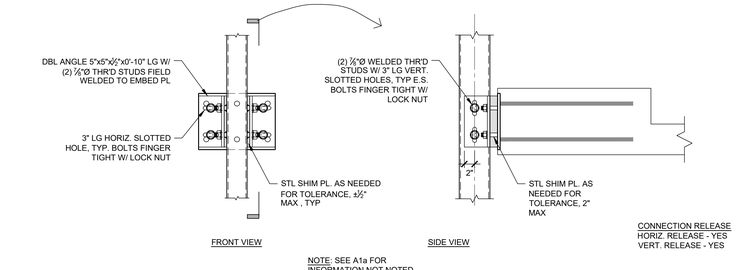
FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - YES; VERT. RELEASE - NO

NOTE: SEE A1a FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	6,005 LBS
	Z - OUT OF PLANE	100 LBS
	Mx	555 LBS-FT
	My	-
	Mz	-
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	9,920 LBS
	Mx	5,235 LBS-FT
	My	115 LBS-FT
	Mz	115 LBS-FT
SEISMIC	X - IN PLANE	-
	Y - GRAVITY	150 LBS
	Z - OUT OF PLANE	185 LBS
	Mx	105 LBS-FT
	My	1045 LBS-FT
	Mz	7,667 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

A3 TYPE A3 - HORZ. SLIP



FRONT VIEW | SIDE VIEW | CONNECTION RELEASE: HORIZ. RELEASE - YES; VERT. RELEASE - YES

NOTE: SEE A1a FOR INFORMATION NOT NOTED

EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	490 LBS
	Mx	1,485 LBS-FT
	My	630 LBS-FT
	Mz	605 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	6,305 LBS
	Mx	7,645 LBS-FT
	My	2,425 LBS-FT
	Mz	340 LBS-FT
SEISMIC	X - IN PLANE	410 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	160 LBS
	Mx	170 LBS-FT
	My	635 LBS-FT
	Mz	1,090 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE LRFD LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

A2 TYPE A2 - VERT & HORZ. SLIP

CAVAGNERO
MARK CAVAGNERO ASSOCIATES ARCHITECTS
1645 Sansome Street, Suite 200 T 415.398.6844
San Francisco, California 94111 F 415.398.6846
www.cavagnero.com

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CONSULTANT

TIPPING
1906 Shattuck Avenue, Berkeley, CA 94704
510.549.1906 www.tippingstructural.com

REGISTERED PROFESSIONAL ENGINEER
MARC ANDREW STEICHEN
No. S6022
Exp. 9-30-26
STRUCTURAL
OF CALIFORNIA

REV	DATE	DESCRIPTION
	2024.06.26	BID PACKAGE NO. 1
5	2024.09.13	95% CD SET
	2024.09.20	PROGRESS SET
	2024.10.16	BID - PERMIT SET
11	2024.12.10	75% CONSTRUCTION DOCUMENTS
16	2025.03.31	ADDENDUM NO.3
53	2025.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

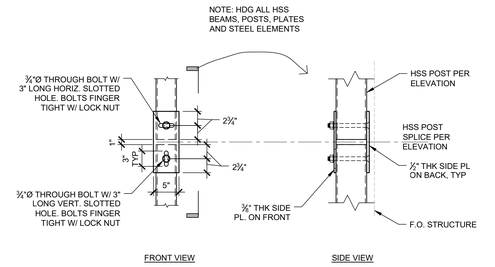
2000 MARIN STREET
SAN FRANCISCO, CA 94124

PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

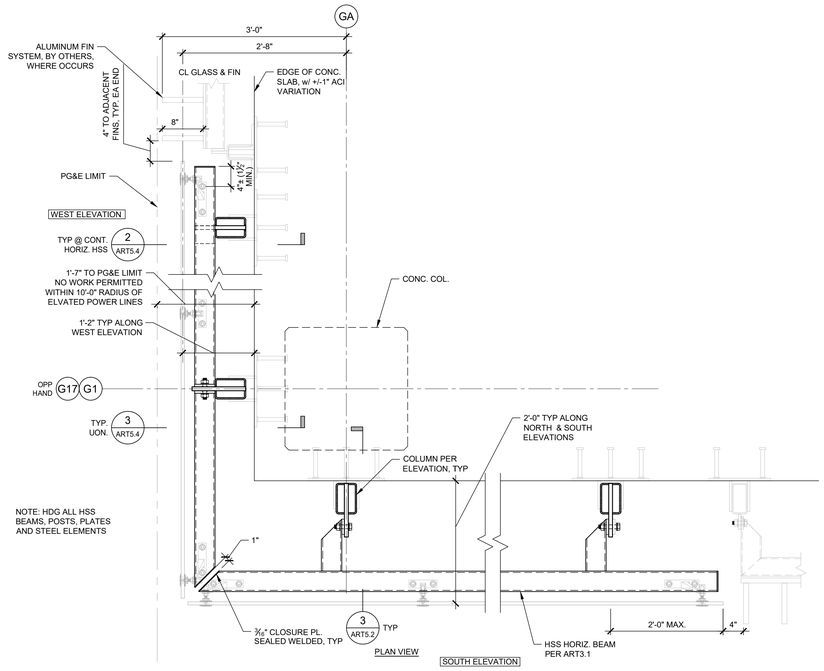
DETAILS

AS NOTED

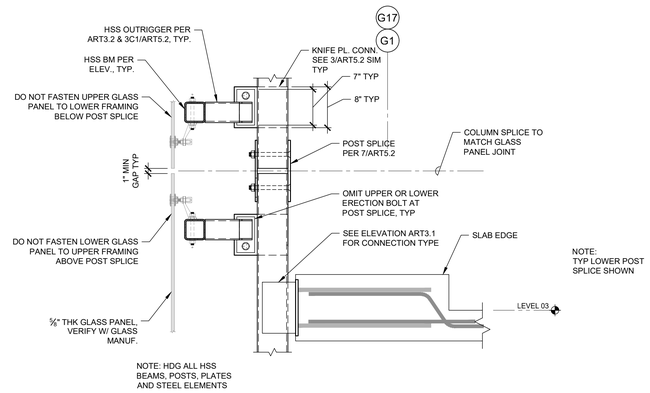
ART5.1



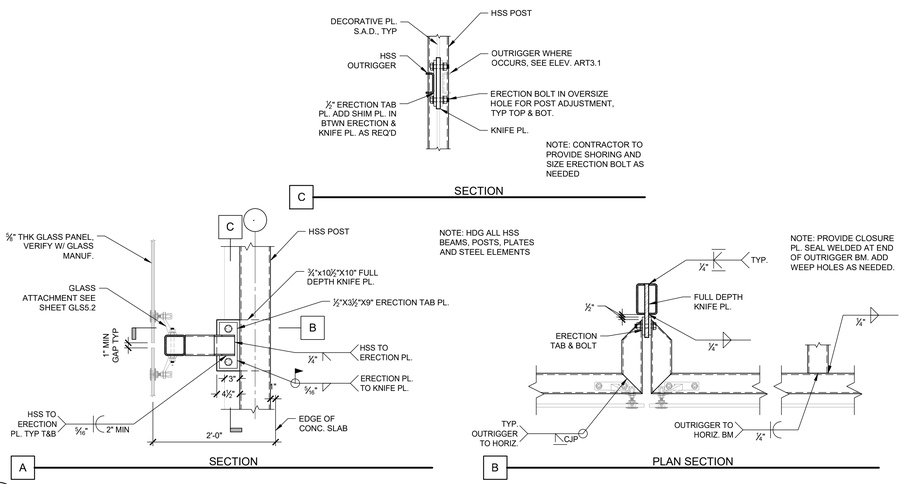
7 ART5.2 TYP POST SPLICE PLATE 1" 1'-0"d



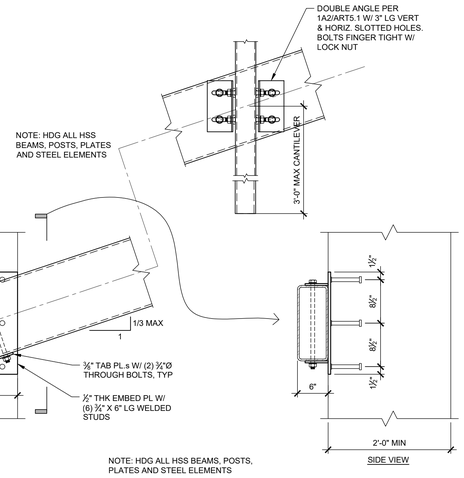
6 ART5.2 PLAN VIEW AT SOUTHWEST CORNER (SIM AT NORTHWEST CORNER) 1" 1'-0"d



4 ART5.2 TYP OUTRIGGER BM AT POST SPLICE 1" 1'-0"d



3 ART5.2 TYP OUTRIGGER @ HSS POST 1" 1'-0"d

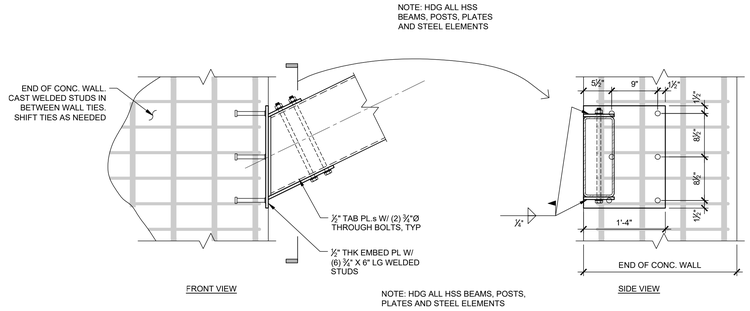


EMBED REACTIONS

BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	395 LBS
	Mx	720 LBS-FT
	My	630 LBS-FT
	Mz	605 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	6,310 LBS
	Mx	7,650 LBS-FT
	My	2,430 LBS-FT
	Mz	-
SEISMIC	X - IN PLANE	410 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	160 LBS
	Mx	170 LBS-FT
	My	-
	Mz	70 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE ULTIMATE LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

D2 TYPE D2 - HSS BEAM TO FACE OF CONC. COLUMN



EMBED REACTIONS

BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	395 LBS
	Mx	720 LBS-FT
	My	630 LBS-FT
	Mz	605 LBS-FT
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	6,310 LBS
	Mx	7,650 LBS-FT
	My	2,430 LBS-FT
	Mz	-
SEISMIC	X - IN PLANE	410 LBS
	Y - GRAVITY	-
	Z - OUT OF PLANE	160 LBS
	Mx	170 LBS-FT
	My	-
	Mz	70 LBS-FT

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE ULTIMATE LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

C1 TYPE C1 - HSS BEAM TO END OF CONC WALL

1 ART5.2 EMBED PLATE DETAILS 1" 1'-0"d

CAVAGNERO
MARK CAVAGNERO ASSOCIATES ARCHITECTS
1945 Sansome Street, Suite 200 T 415.398.6844
San Francisco, California 94111 F 415.398.6846
www.cavagnero.com

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CONSULTANT

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REGISTERED PROFESSIONAL ENGINEER
MARC ANDREW STEYER
No. S6022
Exp. 9-30-26
STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
	2024.06.26	BID PACKAGE NO. 1
5	2024.09.13	90% CD SET
	2024.09.20	PROGRESS SET
	2024.10.16	BID + PERMIT SET
11	2024.12.10	75% CONSTRUCTION DOCUMENTS
16	2025.03.19	ADDENDUM NO.3
53	2025.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

2000 MARIN STREET
SAN FRANCISCO, CA 94124

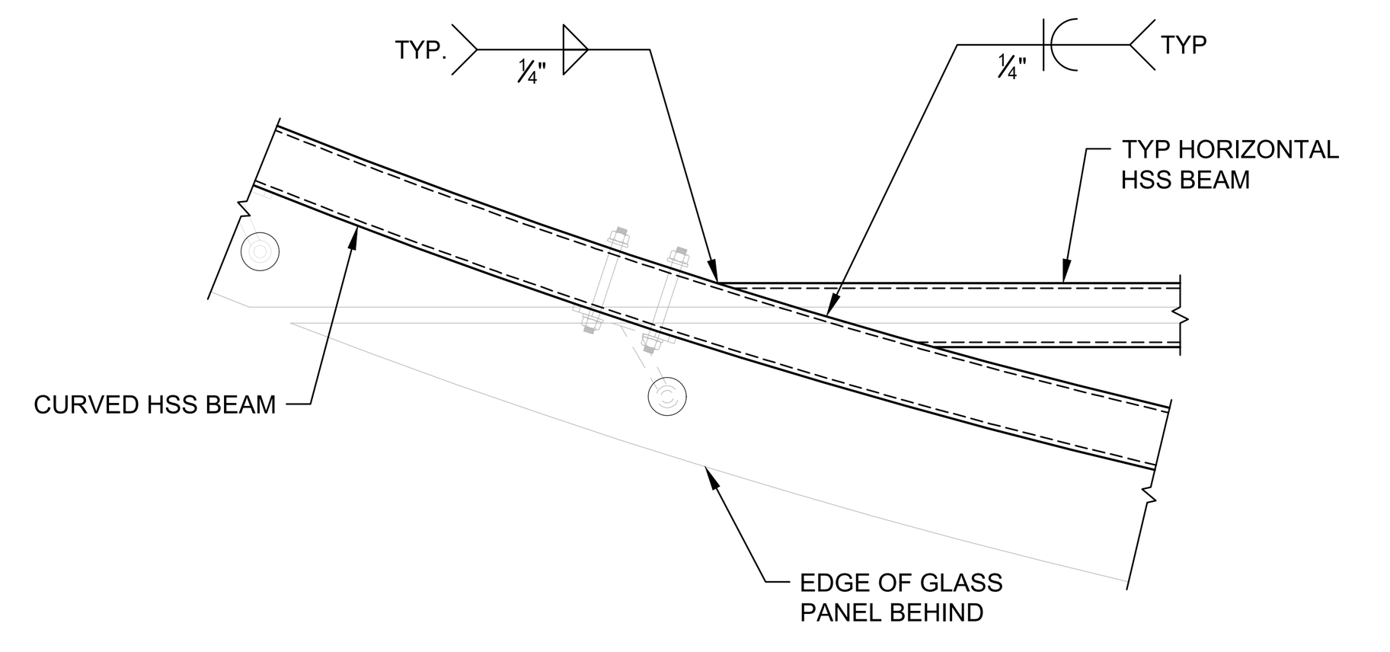
PERMITS: 2023-1215-2620, 2023-1215-2622, 2023-1215-2623, 2023-1215-2632, 2023-1215-2634, 2023-1215-2633
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

DETAILS

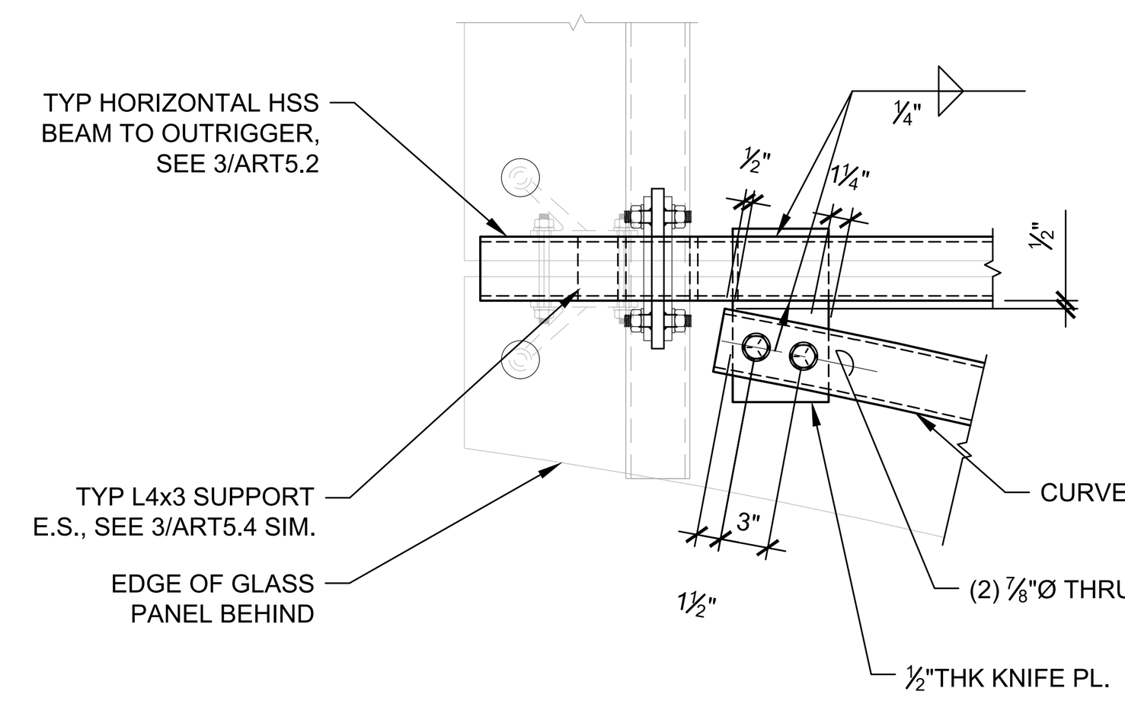
AS NOTED

ART5.2

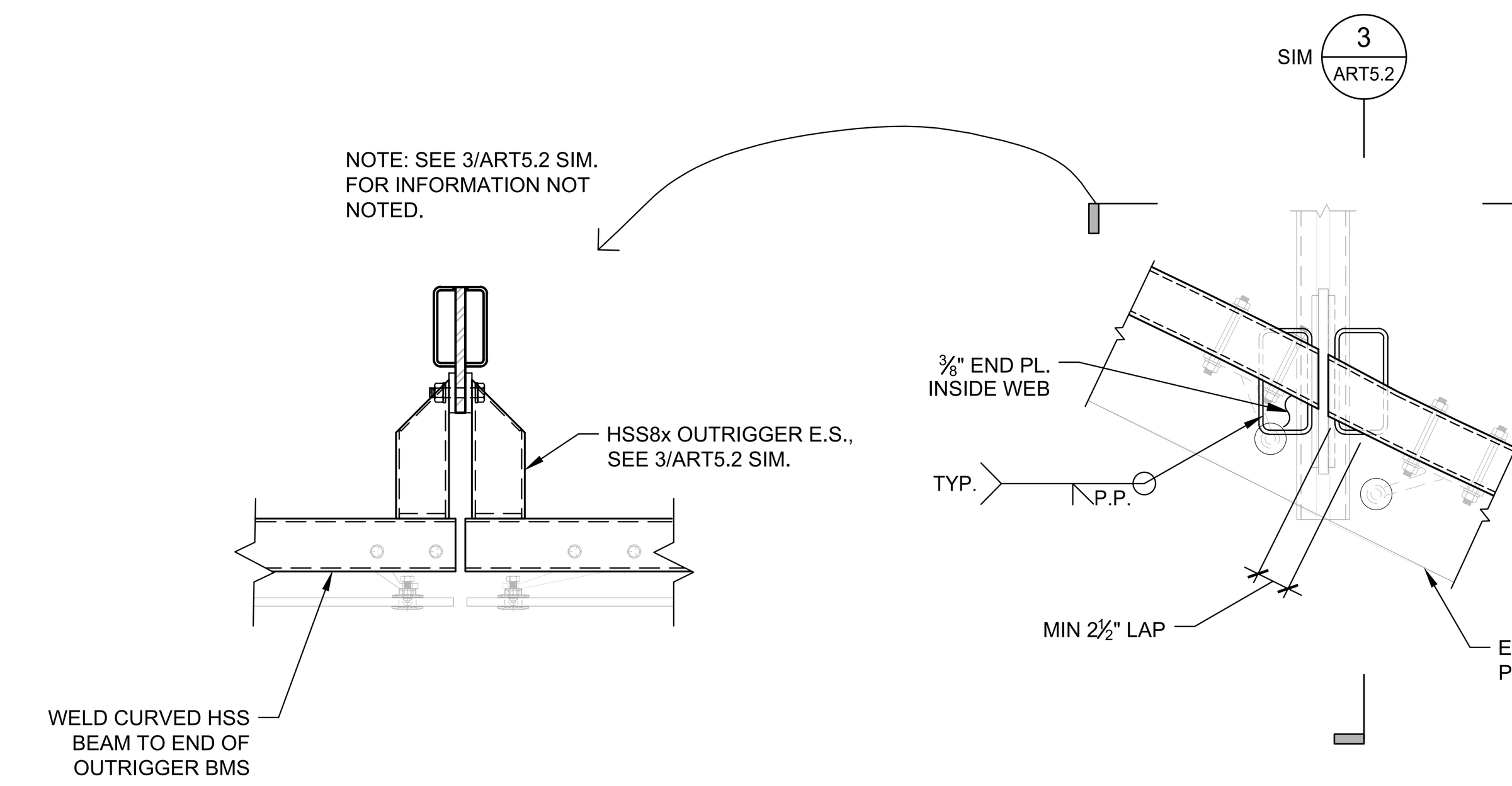
Plotted: Friday, April 10, 2026 12:03:37 PM - By: kelso - Sheet Size: 30x42 - File: X:\2024dwgs\24070\struct\070ART5.2.dwg



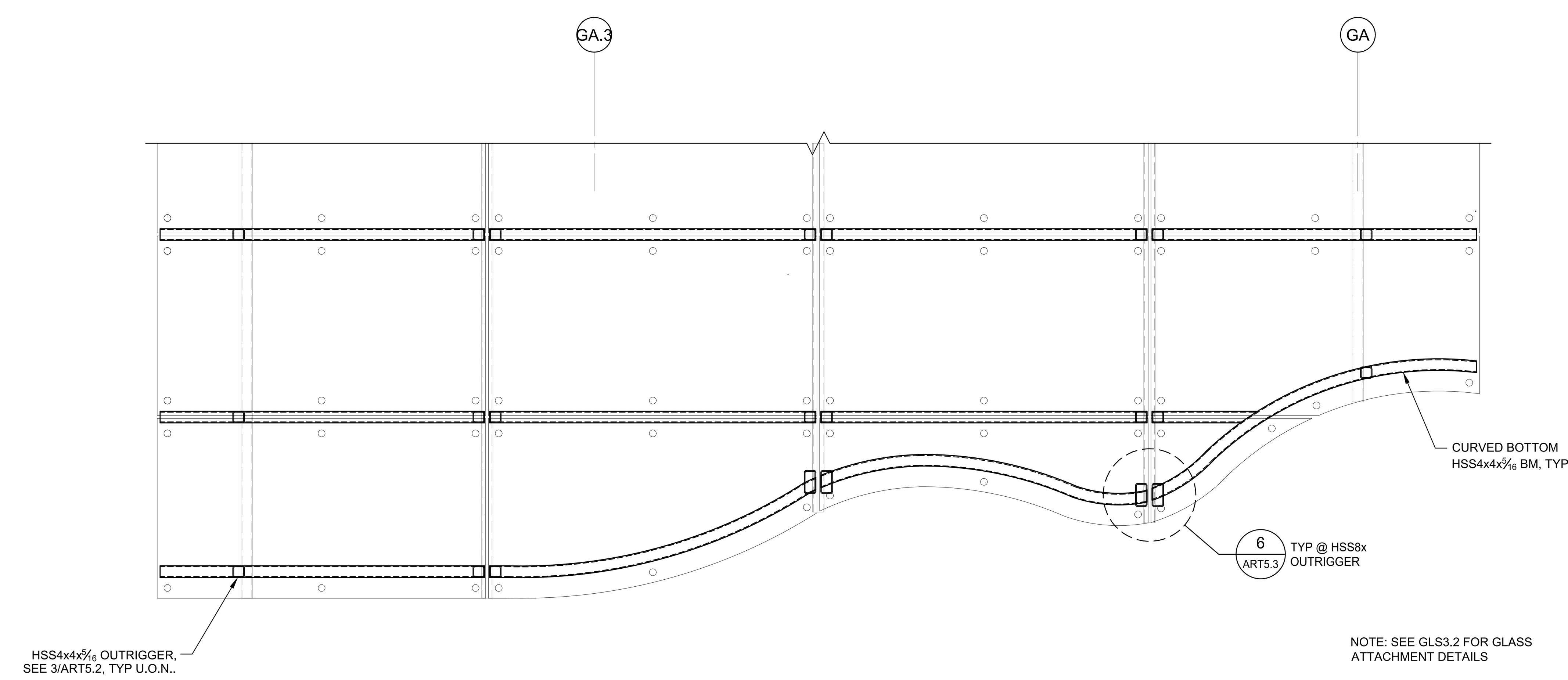
8 ART5.3 TYP HSS TO CURVED BEAM WELDED CONNECTION 1" 1'-0"d



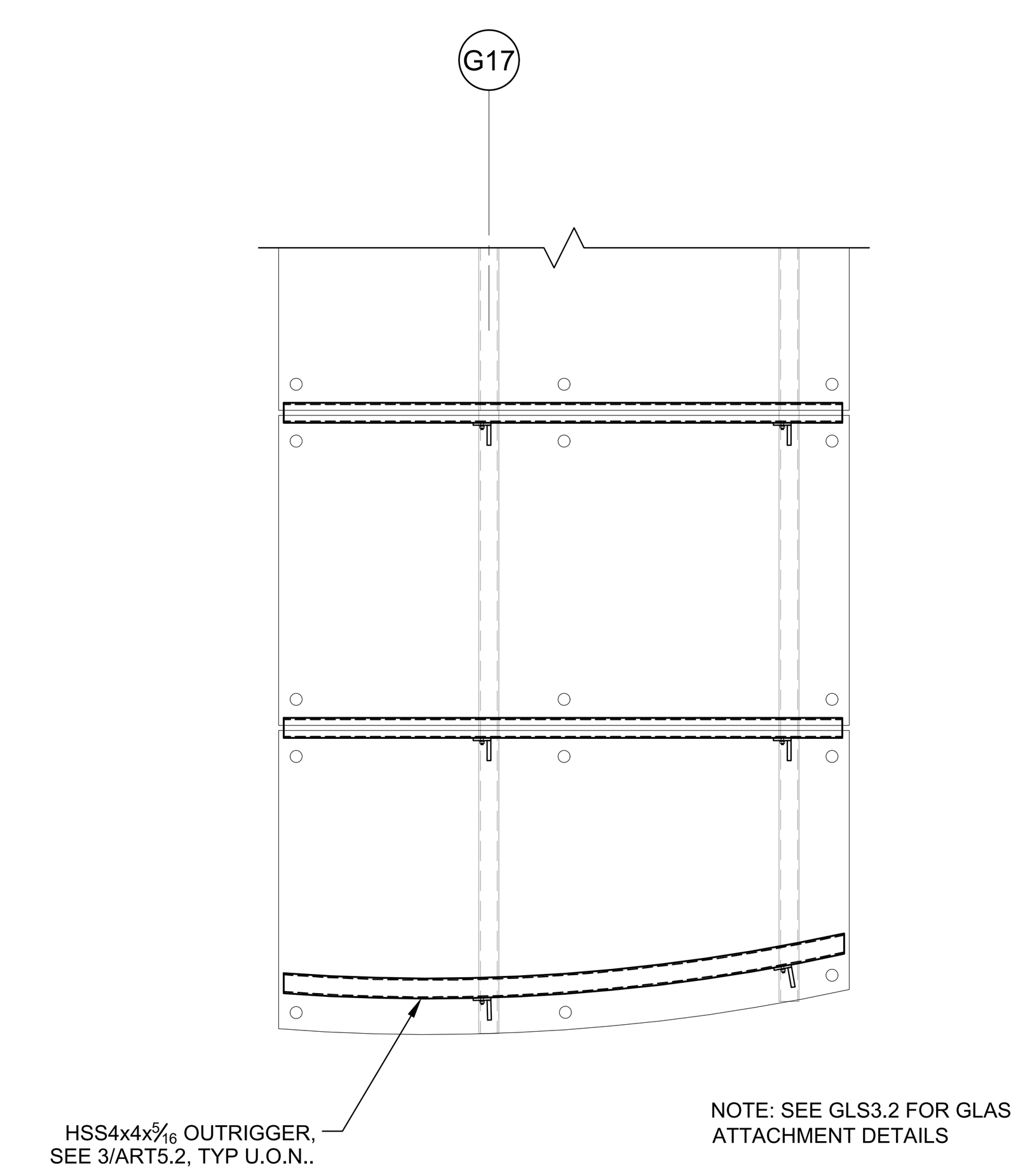
7 ART5.3 CURVED HSS KNIFE PL. CONNECTION 1" 1'-0"d



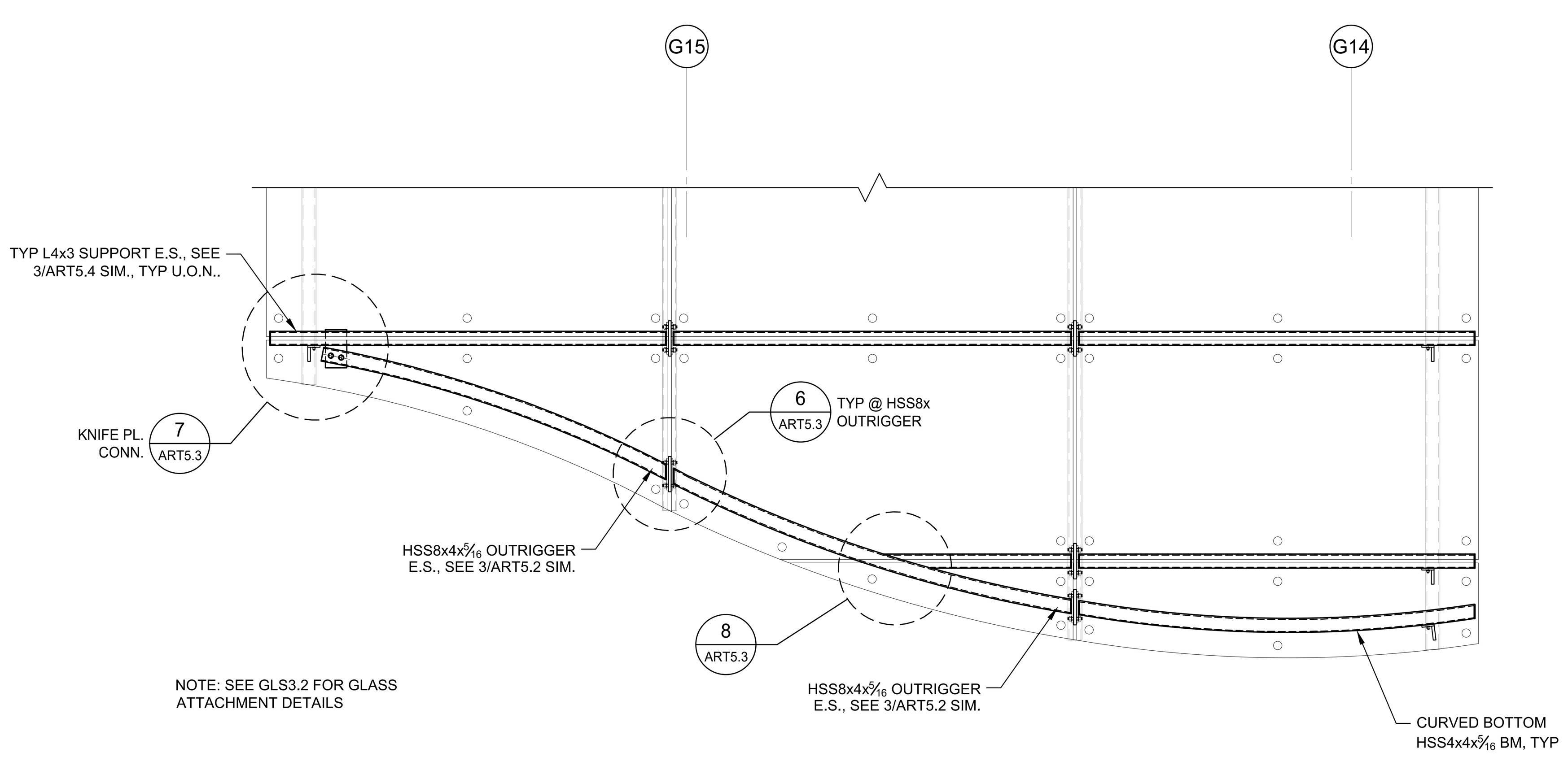
6 ART5.3 HSS8x OUTRIGGER AT CURVED BEAM 1" 1'-0"d



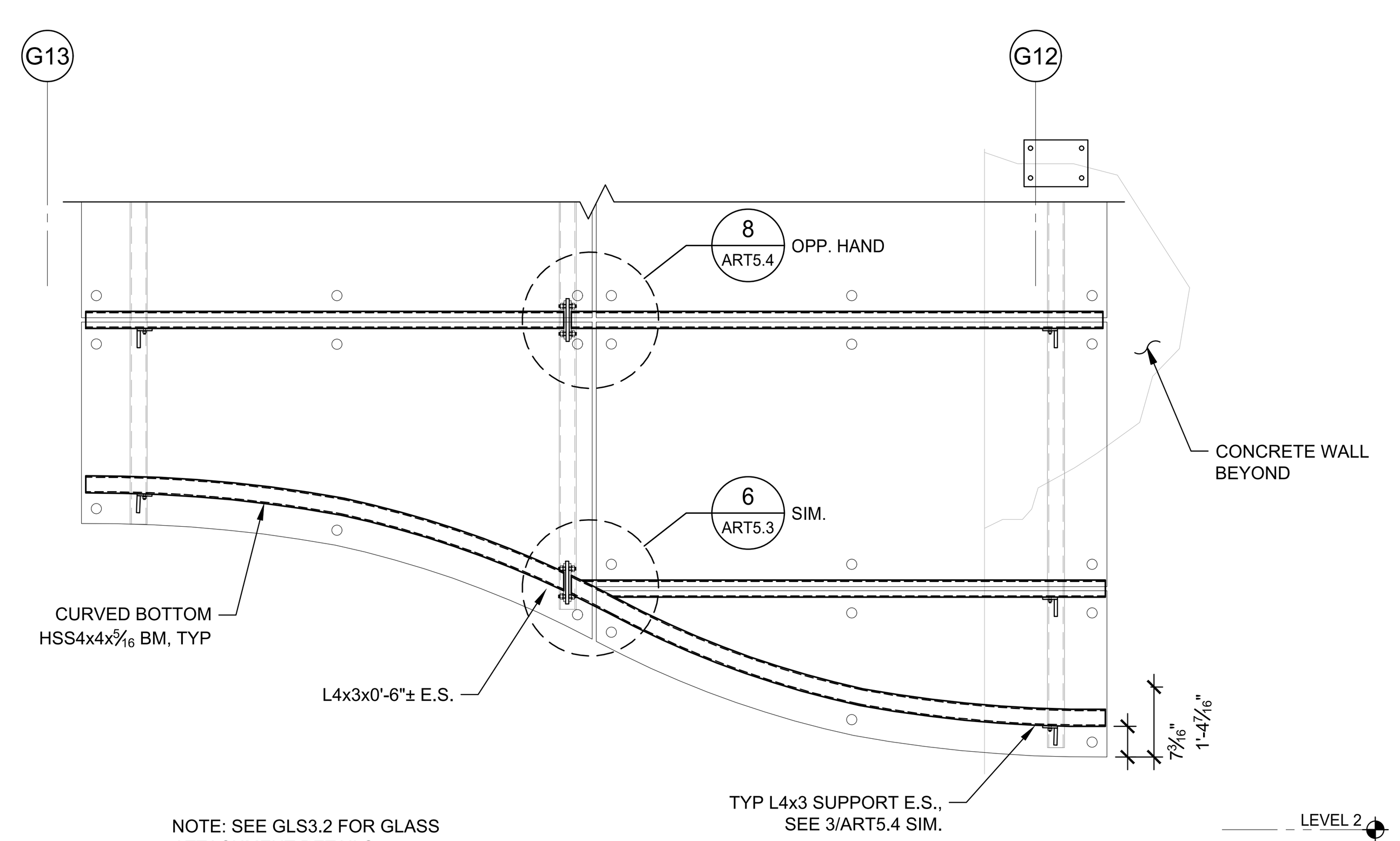
4 ART5.3 HSS CURVED BEAM 3/8" 1'-0"d



3 ART5.3 HSS CURVED BEAM 3/8" 1'-0"d



2 ART5.3 HSS CURVED BEAM 3/8" 1'-0"d



1 ART5.3 HSS CURVED BEAM 3/8" 1'-0"d

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TIPPING
1906 Shattuck Avenue, Berkeley, CA 94704
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CONSULTANT

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MARC ANDREW STEYER
No. S6022
Exp. 9-30-26
STRUCTURAL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION
5	2024.06.26	BID PACKAGE NO. 1
	2024.09.13	50% CD SET
	2024.09.20	PROGRESS SET
	2024.10.16	BID + PERMIT SET
11	2024.12.10	75% CONSTRUCTION DOCUMENTS
16	2025.01.31	ADDENDUM NO.3
53	2026.04.10	ARTS BID SET

SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

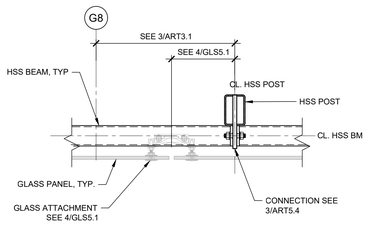
2000 MARIN STREET
SAN FRANCISCO, CA 94124

PERMITS: 2023-1215-2620, 2023-1215-2632, 2023-1215-2634, 2023-1215-2622, 2023-1215-2623, 2023-1215-2635
APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

DETAILS

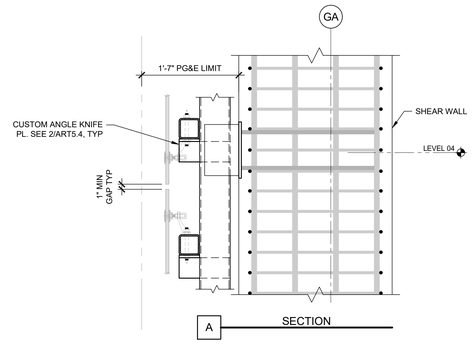
AS NOTED

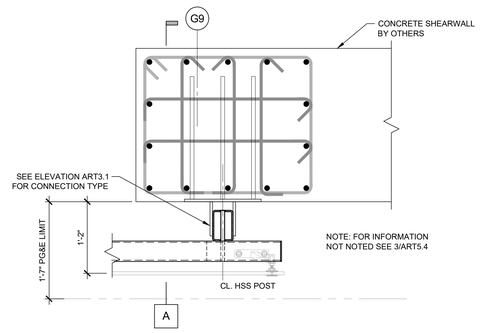
ART5.3



8 ART5.4 — GLASS PANEL POINT AT CONT. HSS BEAM NEAR GL G8

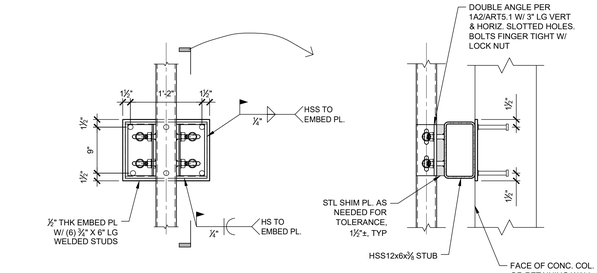
1" 1'-0"d





6 ART5.4 — HSS BM TO POST CONNECTION AT CONCRETE WALL ALONG WEST ELEVATION (PLAN)

1" 1'-0"d



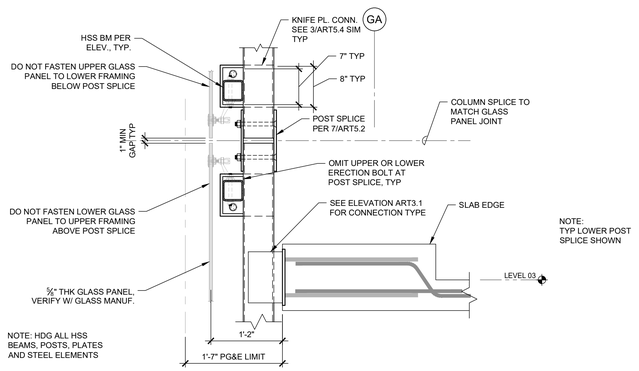
EMBED REACTIONS		
BASIC LOAD EFFECTS	LOAD DIRECTION	MAGNITUDE
DEAD	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	375LBS
	Mx	-
	My	-
	Mz	-
WIND	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	3,720 LBS
	Mx	5,235 LBS-FT
	My	-
	Mz	-
SEISMIC	X - IN PLANE	-
	Y - GRAVITY	-
	Z - OUT OF PLANE	-
	Mx	-
	My	485 LBS-FT
	Mz	-

NOTES:
1. LOADS ARE GIVEN AS 1.0DL,1.0WL & 1.0EQ. WIND AND SEISMIC ARE ULTIMATE LOADS PER ASCE7-16.
2. WIND AND SEISMIC LOADS ARE REVERSIBLE.

E2 — TYPE E2 - COL. TO CONC. COL. & RETAINING WALL

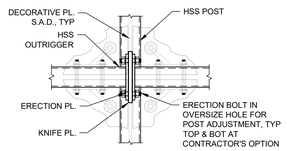
5 ART5.4 — EMBED AT CONC. COLUMN & RETAINING WALL ALONG WEST ELEVATION

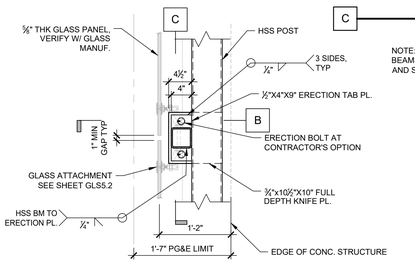
1" 1'-0"d



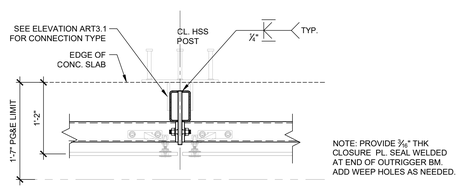
4 ART5.4 — TYP HSS BM AT POST SPLICE ALONG WEST ELEVATION

1" 1'-0"d



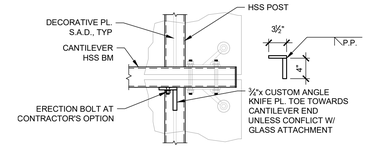


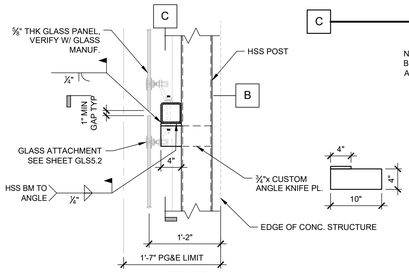
NOTE: HDG ALL HSS BEAMS, POSTS, PLATES AND STEEL ELEMENTS



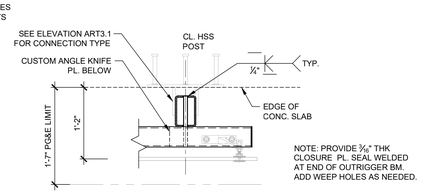
3 ART5.4 — TYP HSS BM TO POST ALONG WEST ELEVATION

1" 1'-0"d





NOTE: HDG ALL HSS BEAMS, POSTS, PLATES AND STEEL ELEMENTS



2 ART5.4 — TYP HSS CANTILEVER BM TO POST ALONG WEST ELEVATION

1" 1'-0"d

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1945 Sansome Street, Suite 200 T 415.398.6844
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SFWD HEADQUARTERS AT 2000 MARIN PARKING GARAGE

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SAN FRANCISCO, CA 94124

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APN PARCELS: 4346 LOT 001, 4346 LOT 001A, 4346 LOT 003, 4347 LOT 001

WEST ELEVATION DETAILS

AS NOTED

ART5.4