Taft Community College - New Student Center

Fire and Life Safety Analysis

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Masters in Fire Protection Engineering

Culminating Project

Spring 2017

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Key Words

- Fire Dynamics Simulator (FDS)
- International Building Code
- Life Safety Analysis
- Performance Based Design for Tenability
- Prescriptive Analysis

Acknowledgments

It is with great pleasure that I take this time to thank those who have been the reason for all my success. I thank my mother for my foundation and for her unending support. I thank my wife for her love and for providing me with a beautiful baby boy, who has become my motivation. My dearest thanks goes to all of my family for their prayer on my behalf, their dedication, and their love.

To all those who hoped for my success, I thank you.

Abstract

The following report is a fire and life safety investigation into a new facility. The planned facility is a new Student Center at Taft Community College. The prescriptive requirements as set forth by the most up to date codes and standards chosen for the project are met. The building has been properly classified with respect to occupancy and construction type. Appropriate design for interior partitions and exterior walls have been identified. Interior finish requirements are elaborated so that adherence to these guidelines is made clear. The fire sprinkler system has an adequate supply of water from the municipal water supply alone to meet the calculated demand of the design area. A fire alarm system is proposed, but the proposed design does not make full use of the benefits of such a system due to reliance on fire sprinklers as a primary means of automatic detection. A third fire system proposed is a kitchen fire suppression system which will be dependent upon the competencies of the installing contractor in meeting the system manufacturer guidelines. Egress components are adequately sized and arranged, and occupant densities throughout the proposed floor plan allow for the fastest occupant movement based on the referenced literature. A performance based analysis has been conducted. Tenability was addressed with regards to visibility, exposure to carbon monoxide, temperature, and flashover conditions. Two design fire scenarios from the 2015 NFPA 101: Life Safety Code were chosen. The first involved Design Fire Scenario 1, which was modeled as a trash bag fire in an office. Results of this study found that the ASET exceeded RSET. ASET was set by tenability criteria for visibility while RSET was found using hydraulic calculation methods for the compartment where the fire was located. The second fire scenario involved Design Fire Scenario 6, which was modeled by burning bookcases located in a bookstore. ASET exceeded RSET for this study as well. ASET was set by visibility criteria while RSET was set by a full building egress time calculation based on hydraulic calculation methods. Recommendations for improving life safety at the Student Center include: (1) monitoring special events to ensure that neither decorations nor implements impede the means of egress or introduce materials which present a severe fire hazard; (2) resizing an exit within the Bookstore to match a second exit so that occupants can clearly identify this exit as an alternate means of egress; (3) monitoring for any changes in how areas in the Student Center are used to ensure adequacy of exits and egress components; (4) Adding redundancy for the fire sprinkler water flow switch to fire alarm monitor module connection.

Table of Contents

Figures and Tables

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 1: Project Introduction

Project Introduction

As a student in the Masters of Fire Protection Engineering program at California Polytechnic State University I have been tasked with investigating the fire and life safety features of a significant facility. For this project a new Student Center constructed at Taft Community College will be used. The purpose of this report is to consider the prescriptive fire protection and life safety requirements contained in the codes and standards applicable to the Student Center. Code and standard references are identified throughout this report when used.

A second major goal is to provide a performance-based analysis of key fire and life safety components: the fire alarm system, fire sprinkler system, and egress system. The goal is to discover whether the fire and life safety systems as proposed can ensure occupant safety under realistic fire scenarios.

The Student Center will provide an updated building to serve campus needs. It shall provide direct access to a newly remodeled on-campus courtyard and major walkway. The Student Center has public street access with the goal of allowing community members to utilize the building services along with students and faculty. Services at the student center are to include a kitchen, dining facility, student commons area, and a bookstore.

A rendering of the student center is provided in Figure 1.1 below.

Figure 1.1: Rendering of Student Center

A plan view of the student center is provided in Figure 1.2 below. With this view one can see how the new facility is oriented with respect to the campus and the public ways. A county library is located due north of the Student Center. A public street, Wildcat Way, is located due east of the Student Center. The student dorms are to the South, and a campus courtyard is located to the West of the Student Center.

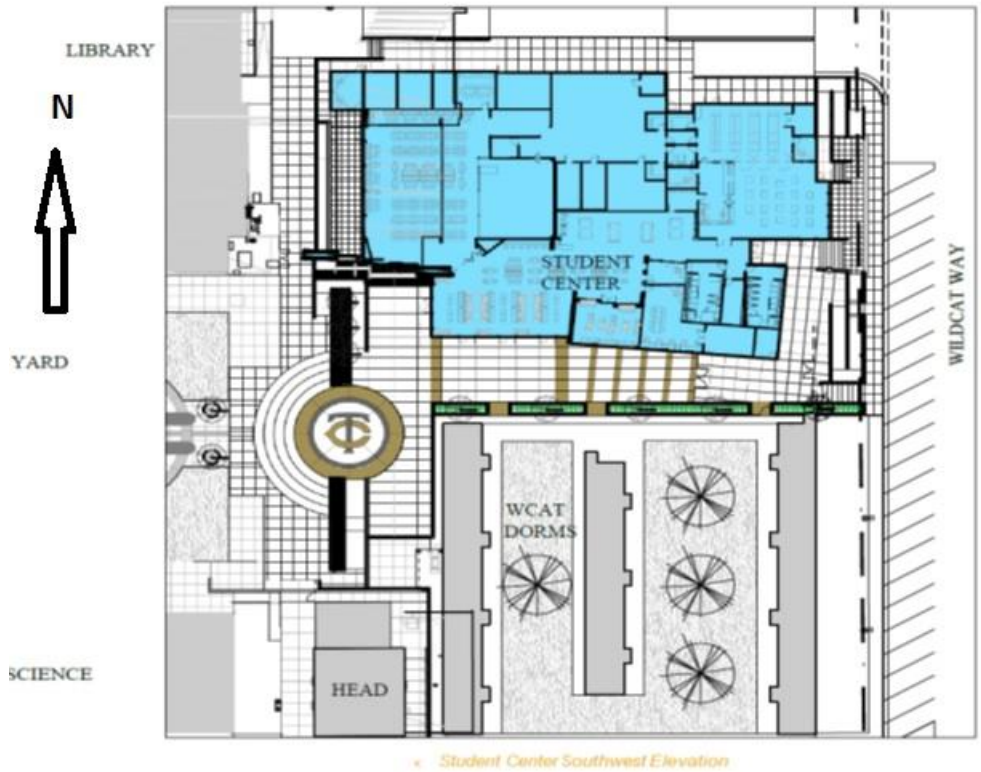


Figure 1.2: Plan View of Student Center and Adjacent Facilities

The Student Center is designed as a one-story building with a 21,000 sq. ft. floor area. The building height will be 35ft. There are three fire protection systems planned for this facility: fire alarm, fire sprinkler, and a kitchen fire suppression system. A floor plan of the Student Center is provided in Figure 1.3.

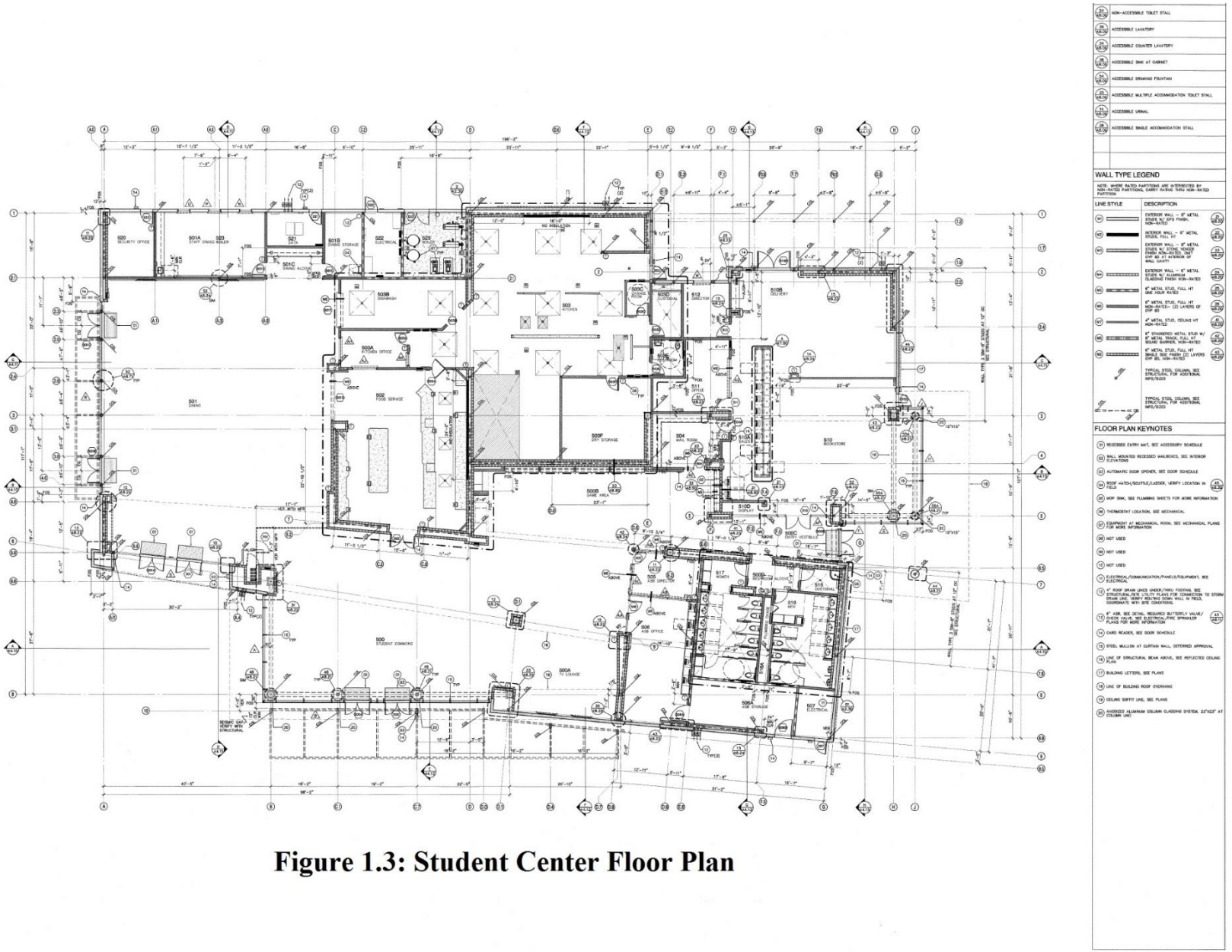


Figure 1.3: Student Center Floor Plan

A number of codes and standards were used in evaluating the life safety systems of the Student Center. The 2015 International Building Code is the controlling document for the analysis that follows. Use of the most recent IBC edition satisfies the goal of proceeding with the project using the most up to date and widely accepted building practices in place for North America. Although many jurisdictions have versions of building codes based on amendments to the International Building Code, understanding the original document prepares one with a strong sense of acceptable building practices in general.

The following list is used to provide an overview and concise treatment of the codes, standards, and resources used for this project. Each document was chosen to provide the most up to date treatment of the relevant fire and life safety systems. Each document is followed in parenthesis by the term that it will be referred to henceforth when not fully named, where applicable.

- 2015 International Building Code (IBC)
- 2015 NFPA 101: Life Safety Code (LSC)
- 2013 NFPA 72: National Fire Alarm Code (NFPA 72)
- 2012 NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems (NFPA 90A)
- 2015 International Mechanical Code (IMC)
- 2015 International Fire Code (IFC)
- 2016 NFPA 13: Standard for the Installation of Sprinkler Systems (NFPA 13)
- 2014 NFPA 25: Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems (NFPA 25)
- 2013 NFPA 17A: Standard for Wet Chemical Extinguishing Systems (NFPA 17A
- Fire Protection Handbook, 20th Edition (NFPA Handbook)
- NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants (NFPA 291).
- 2015 NFPA 92: Standard for Smoke Control Systems (NFPA 92).
- SFPE Handbook of Fire Protection Engineering, 5th Edition (SFPE Handbook)
- Fire Dynamics Simulator Technical Reference Guide Volume 3: Validation (FDS Validation Guide)
- Fire Dynamics Simulator User Guide (FDS User Guide)
- Kim, Hyeong-Jin and David G. Lilley. "Heat Release Rates of Burning Items in Fires." AIAA 2000-0722. 38th Aerospace Sciences Meeting & Exhibit. Reno, NV. January 2000.
- Walton, WD and EK Budnick. "Quick Response Sprinklers in Office Configurations: Fire Test Results." NBSIR 88-3695. US Department of Commerce. Maryland: 1988.

Where one or more codes or standards conflict, the most stringent requirements will be enforced.

The main focus of this project is to understand whether the initial design satisfies the most current requirements and to enhance the fire and life safety of the building design with a performance based analysis. Where appropriate and beneficial, commentary will be provided to elaborate on fire and life safety requirements, systems, and practices.

This project is organized to follow the order of the topics presented in the IBC by chapter and then by section. Not all subjects contained in the IBC are applicable to this project. Starting with an

examination of the use and occupancy classification for the Student Center will set the ground work for discussing fire and life safety system requirements.

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 2: Use and Occupancy Classification, Building Type, and Fire and Smoke Protection Features

Use and Occupancy Classification, Building Type, and Fire and Smoke Protection Features

Designers must translate the intent of building stakeholders into a framework that satisfies the constraints that these same stakeholders place on the project. Selection of the building construction type based on the IBC categories is perhaps the next most important step in a project lifecycle after the location and intended function of the building are decided. Fire and life safety requirements are impacted substantially by the selection of a construction type and the arrangement of uses within a building. This section considers the uses that the Student Center must be able to accommodate to meet its campus functions, the building type selection chosen by the design team, and the ramifications that these selections have.

Use & Occupancy, and Building Construction Type

Occupancy Determination

Occupancy classification for the Student Center is identified on the project documents as A-2/F-1/M, non-separated occupancies. Group A-2 allows the use of cafeterias associated with commercial kitchens for food and/or drink consumption. The F-1 classification applies to the kitchen, which will use industrial style cooking equipment. Group M, mercantile, allows a portion of the student center to keep stock of goods and to sell such goods. The bookstore area fall under the Group M occupancy classification. Figure 2.1 below shows the relationship between the occupancies at the Student Center.

Given the use of multiple occupancies, Section 302.1 of the IBC refers one to Section 508 where mixed use and occupancy requirements are set forth. The Student Center is designed to follow Section 508.3 describing non-separated occupancies. The most restrictive occupancy is Group A-2.

With the Student Center falling under IBS Section 508.3, the most restrictive requirements of the occupancies present must be used when determining the total allowable building height and area. A major benefit of 508.3.3 it that no separation (fire resistance rated construction) is required between the occupancies.

Section 309.2 of the IBC addresses mercantile occupancies. It requires that hazardous materials be contained in a single control area of such occupancies and remain under the quantities listed in Table 414.2.5(1) of the IBC. At present, there are no control areas defined for the bookstore or food service area. Therefore, the Student Center must not store or display hazardous materials.

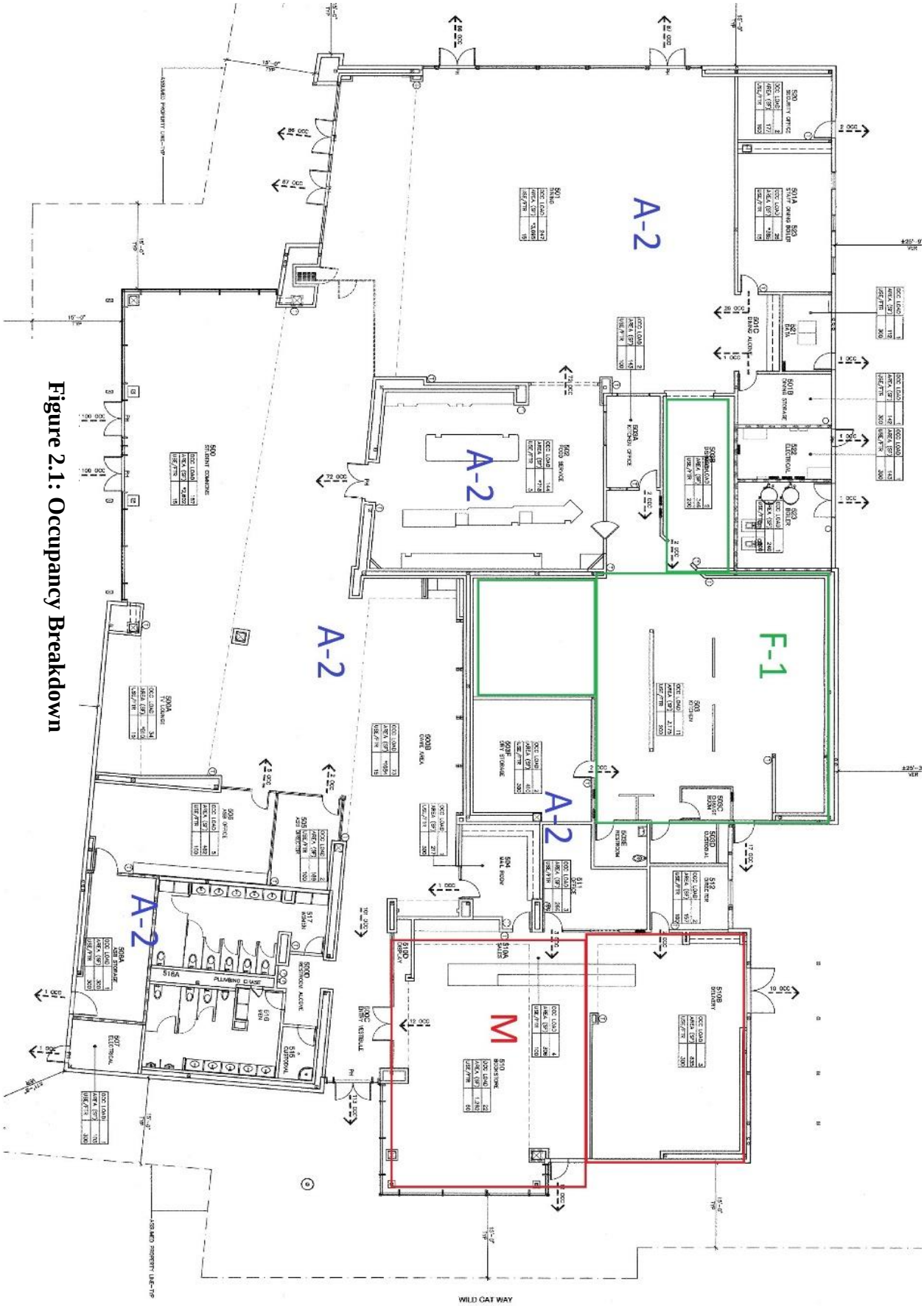


Figure 2.1: Occupancy Breakdown

Building Construction Type Classification

Chapter 5 of the IBC provides guidance for determination of the appropriate construction type classification for the Student Center. Section 503.1.2 allows the Student Center to be treated separately from other campus buildings, even though such buildings may be on the same lot.

The following properties of the Student Center will be relevant to consider:

- Number of stories: 1
- Floor area: 21,000 sq. ft. or less
- Building Height: 35 ft. or less
- Automatic sprinklers: Yes
- Occupancy classification: A-2 (most restrictive), F-1, and M
- Frontage Area: Not used

Elimination of construction types does not occur with regards to the allowable building height, Table 504.3, or with the allowable number of stories, Table 504.4. In both cases the Student Center qualifies for all construction types, even with regard to 504.2.

The 2015 IBC includes area increase factors for fire sprinklers in Table 506.2. Here again the type of occupancy is not limited by the building properties, even when considering the most restrictive occupancy, A-2.

Ultimately, the design team chose Type II-B construction for the Student Center. This choice is in accordance with the code provisions as discussed above.

Fire Resistance Requirements

Selection of Type II-B construction means that IBC Table 601 does not place any requirements for fire resistance rated construction. The structural frame, interior walls, exterior walls, floor, and roof of the Student Center are not required to carry fire resistance ratings as shown by IBC Table 601. Moreover, IBC Table 602 shows that the Student Center is not required to have rated exterior walls since the fire separation distance is greater than 30 ft. for this Group A-2 occupancy.

Requirements for the construction assemblies falls to IBC Section 602.1.1, which requires the building elements to be of noncombustible materials. The Student Center follows this requirement without making use of exceptions for combustible elements in IBC Section 603.

Incidental Use

Use of a boiler room and a room for the storage of linens set in motion the need for the special treatment of such areas.

The boiler room is considered an incidental use per IBC Section 509 and Table 509. This requires a 1-hour fire resistance separation between the boiler room and other areas of the Student Center. Section 509.2 allows incidental uses to be classified under the same occupancy classification as the building occupancy where they are located, in this case Group A-2. IBC Section 509.3 limits the

area of incidental uses to ten percent of the building area. The boiler room has an area of 240 sq. ft., well below the ten percent threshold. It happens that the use of sprinkler protection in the boiler room as planned would negate the need for the 1-hour fire separation. However, the design team has chosen to install both sprinklers and the 1-hour fire separation. IBC Section 509.4.1 requires the 1-hour separation to consist of a fire barrier as defined in IBC Section 707.

The ASB Storage, Room 506A, also falls under the incidental use classification due to the expected storage of linens. The linens likely relate to student activities. There is a possibility, however, that the ASB Storage is intended for storing hazardous materials and must be considered a control area per IBC Section 414 rather than an incidental use. Although unlikely, at some point it will be helpful for the design documents to specifically detail the intended use of this space.

It also happens that another room, Electrical Room 522, is shown to have fire resistance rated walls. At this stage of analysis, and with the detail provided by the project plans, an exact reason or requirement for this construction cannot be identified.

One potential reason why Electrical Room 522 is required to have fire resistance-rated construction concerns IBC Section 1020.6. This section address corridor continuity and provides that "where the path of egress travel within a fire resistance-rated corridor to the exit includes travel along unenclosed exit access stairways or ramps, the fire resistance rating shall be continuous for the length of the stairway or ramp…". This may be triggered if the doors leading to the Boiler Room and Electrical Room share a ramp, or share a platform. In this case, the design team may be taking extra caution to ensure that the egress from the boiler room is protected.

A second reason why Electrical Room 522 is required to have fire resistance-rated construction is that this may be necessary to comply with local Authority Having Jurisdiction practices.

Section 315.3.3 of the IFC prevents storage of combustible materials in the electrical and boiler rooms. It is also noted that the total areas of the Electrical Room 522, ASB Storage, and Boiler Room taken together do not exceed ten percent of the Student Center floor area.

Materials and Designs Related to Construction Assemblies

The following is an outline of the construction assemblies proposed for the Student Center.

Structural Framing

The structural frame for the Student Center is composed of steel W-shaped beams and columns. Such members are specified to conform to ASTM A-992 with a yield strength of 50 KSI. Open-web steel joists are used to support the roof decking.

Floor and Roof Assemblies

As a one-story building the first floor is composed of cast-in-place concrete. The concrete is to be reinforced with steel members with 1.5" of concrete cover. The total thickness of the concrete is to be 5". This floor is to rest on a prepared subgrade foundation. The roof system is to consist of metal decking supported by steel joists and HSS tube steel columns.

Exterior Walls

Exterior walls are to utilize an EIFS system with interior gypsum that is Type X and min 5/8" thick. There are also curtain wall systems that provide vision glass and comprise the clerestory. The curtain walls are composed of aluminum framing.

Interior Walls and Partitions

A portion of interior walls are to be 12" thick, composed of concrete block filled with mortar, and are to rest on subgrade footings. A thin brick veneer is to be applied to both sides of these walls. A second subset of interior partitions are composed of steel stud framed wall assemblies using gypsum wall board.

Fire Rated Assemblies

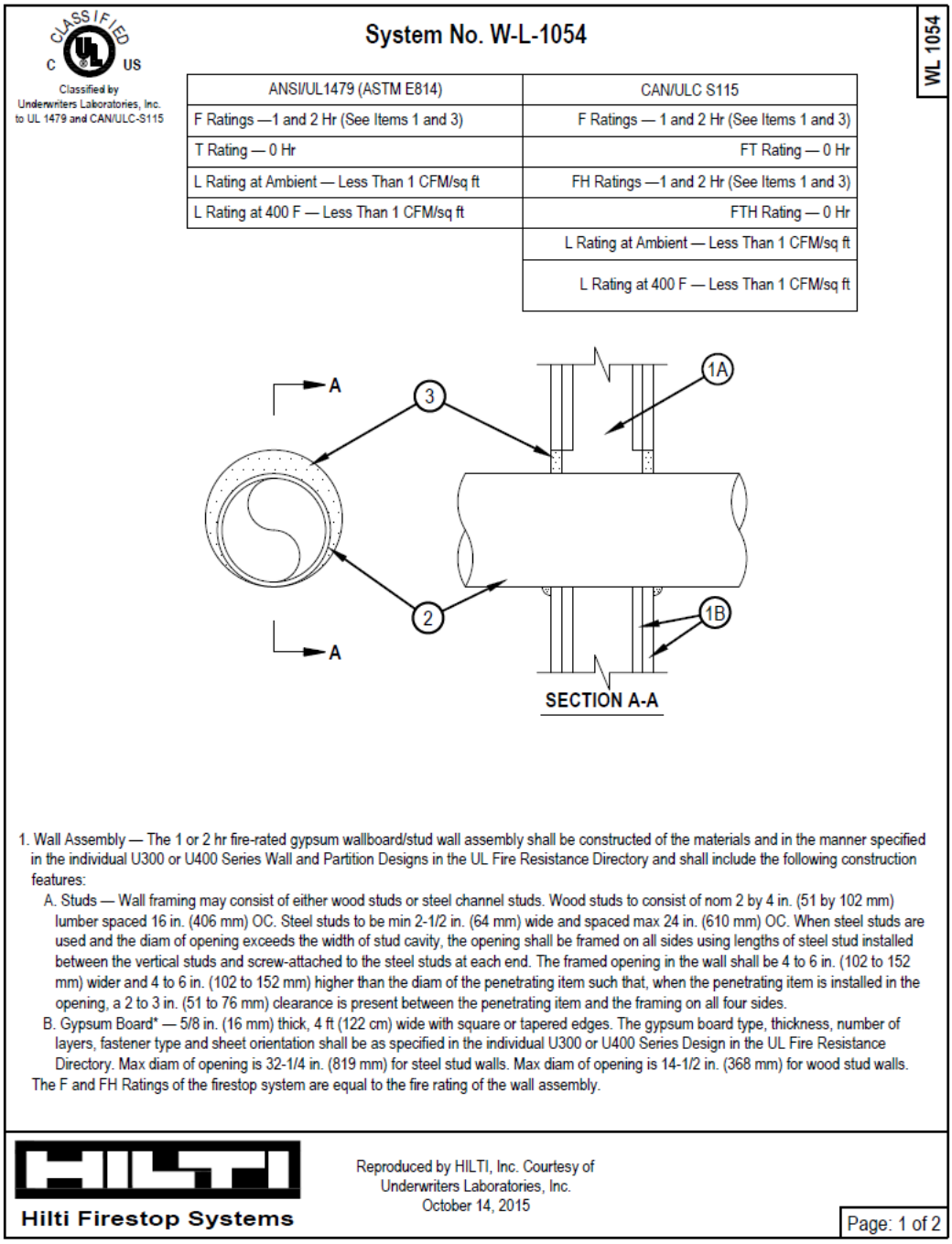
Fire resistance rated assemblies for the incidental use areas are required to be fire barriers complying with IBC Section 707. One requirement with regards to fire barriers concerns continuity in Section 707.5. The fire barrier must extend from floor to the underside the metal deck assembly and must be continuous up through the concealed space above the gypsum ceiling.

IBC Section 703.2 provides that where a building element must be fire-resistance rated, the rating shall be determined in accordance with ASTM E119 or UL 263. UL provides an extensive online library of assemblies listed for fire resistance under UL 263.The project plans only specify a gypsum framed wall assembly with 6" wide steel studs for the fire barriers. This allows for many designs classified under the UL U400/V400 series.

Limits to openings in the fire barrier are provided in IBC Section 707.6.

IBC Sections 707.7 and 707.8 set requirements for penetrations through fire barriers and for joints between fire barriers, respectively. For penetrations, IBC Section 714 must be adhered to. This section specifies that penetrations must be protected with an approved through-penetration firestop system tested in accordance with ASTM E814/UL 1479. A similar provision is set for joints in Section 715 where the firestop joint system must be tested to ASTM E1966/UL 2079. These firestop requirements are mentioned specifically because they are an often overlooked aspect of fire protection systems. Poor planning on the part of architects and mechanical, electrical, drywall, and other contractors can result in penetrations or joints that unduly complicate firestop efforts.

The requirements of 714 will apply to the Student Center. Figures 2.2, 2.3, and 2.4 below contain common firestop systems for penetrations through gypsum framed wall assemblies.



Classified by
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System No. W-L-1054

WL 1054

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings —1 and 2 Hr (See Items 1 and 3)	F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Ratings —1 and 2 Hr (See Items 1 and 3)
L Rating at 400 F — Less Than 1 CFM/sq ft	FTH Rating — 0 Hr
	L Rating at Ambient — Less Than 1 CFM/sq ft
	L Rating at 400 F — Less Than 1 CFM/sq ft

SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing on all four sides.

   B. Gypsum Board* — 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. (819 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly.

Hilti Firestop Systems

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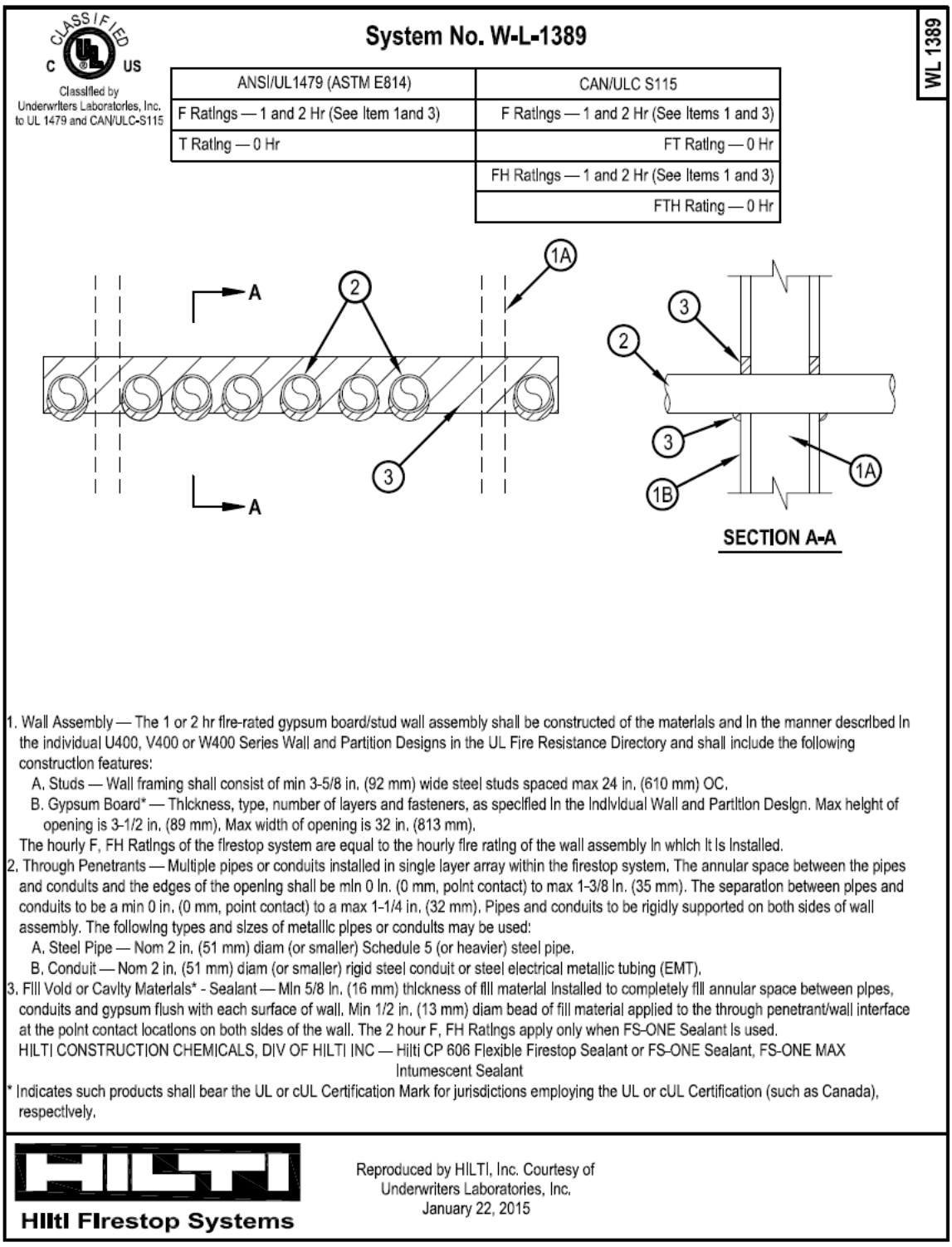
Page: 1 of 2

Figure 2.2: Firestop System Detail



WL 1389

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115

System No. W-L-1389

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1and 3)	F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Ratings — 1 and 2 Hr (See Items 1 and 3)
	FTH Rating — 0 Hr

SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing shall consist of min 3-5/8 in. (92 mm) wide steel studs spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — Thickness, type, number of layers and fasteners, as specified in the Individual Wall and Partition Design. Max height of opening is 3-1/2 in. (89 mm). Max width of opening is 32 in. (813 mm).

   The hourly F, FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. Through Penetrants — Multiple pipes or conduits installed in single layer array within the firestop system. The annular space between the pipes and conduits and the edges of the opening shall be min 0 in. (0 mm, point contact) to max 1-3/8 in. (35 mm). The separation between pipes and conduits to be a min 0 in. (0 mm, point contact) to a max 1-1/4 in. (32 mm). Pipes and conduits to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or conduits may be used:
   A. Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Conduit — Nom 2 in. (51 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).
3. Fill Void or Cavity Materials* - Sealant — Min 5/8 in. (16 mm) thickness of fill material installed to completely fill annular space between pipes, conduits and gypsum flush with each surface of wall. Min 1/2 in. (13 mm) diam bead of fill material applied to the through penetrant/wall interface at the point contact locations on both sides of the wall. The 2 hour F, FH Ratings apply only when FS-ONE Sealant is used.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — Hilti CP 606 Flexible Firestop Sealant or FS-ONE Sealant, FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

HILTI

Hilti Firestop Systems

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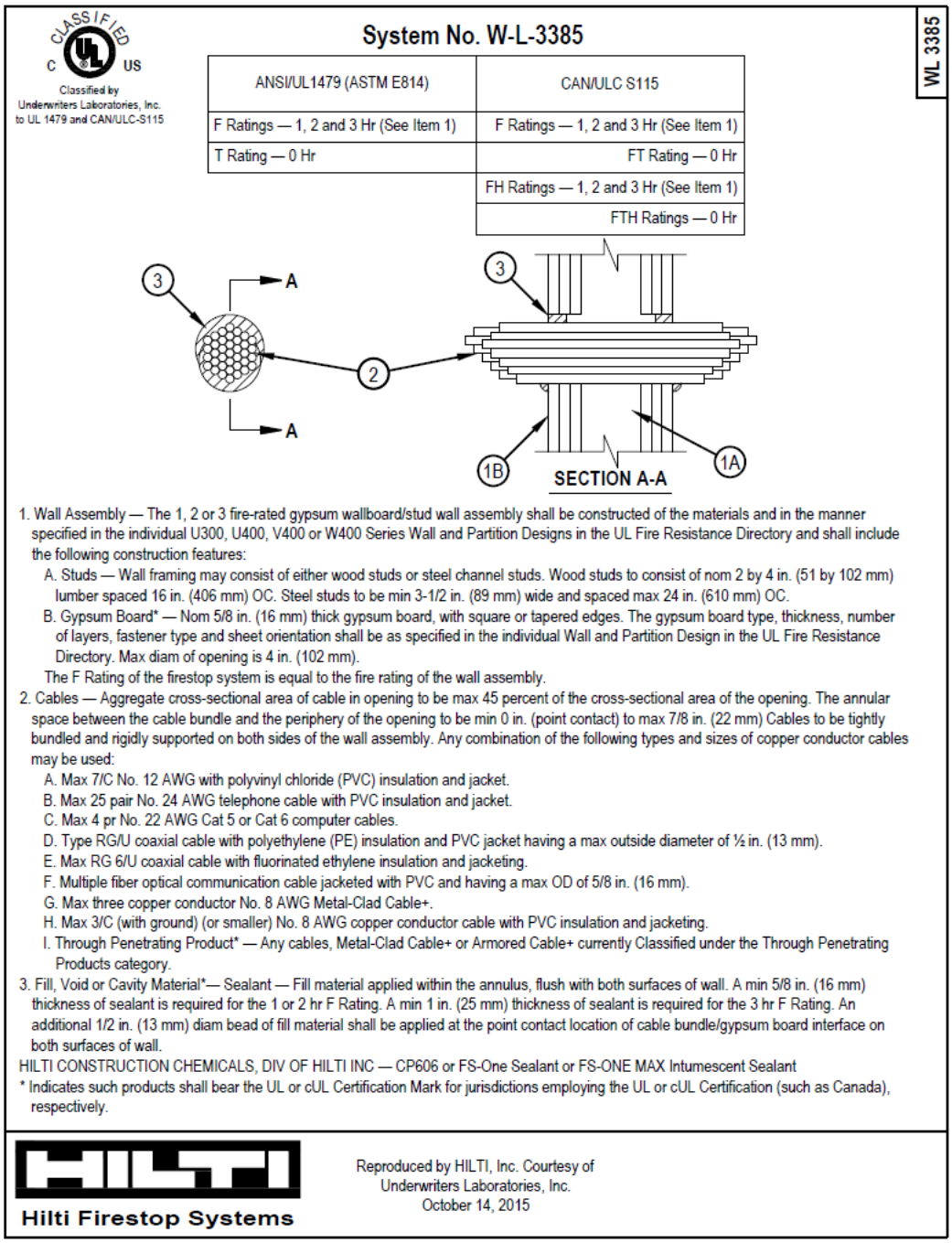
Figure 2.3: Firestop System Detail



System No. W-L-3385

WL 3385

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ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1, 2 and 3 Hr (See Item 1)	F Ratings — 1, 2 and 3 Hr (See Item 1)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Ratings — 1, 2 and 3 Hr (See Item 1)
	FTH Ratings — 0 Hr

SECTION A-A

1. Wall Assembly — The 1, 2 or 3 fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board, with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max diam of opening is 4 in. (102 mm).
   The F Rating of the firestop system is equal to the fire rating of the wall assembly.
2. Cables — Aggregate cross-sectional area of cable in opening to be max 45 percent of the cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening to be min 0 in. (point contact) to max 7/8 in. (22 mm) Cables to be tightly bundled and rigidly supported on both sides of the wall assembly. Any combination of the following types and sizes of copper conductor cables may be used:
   A. Max 7/C No. 12 AWG with polyvinyl chloride (PVC) insulation and jacket.
   B. Max 25 pair No. 24 AWG telephone cable with PVC insulation and jacket.
   C. Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.
   D. Type RG/U coaxial cable with polyethylene (PE) insulation and PVC jacket having a max outside diameter of ½ in. (13 mm).
   E. Max RG 6/U coaxial cable with fluorinated ethylene insulation and jacketing.
   F. Multiple fiber optical communication cable jacketed with PVC and having a max OD of 5/8 in. (16 mm).
   G. Max three copper conductor No. 8 AWG Metal-Clad Cable+.
   H. Max 3/C (with ground) (or smaller) No. 8 AWG copper conductor cable with PVC insulation and jacketing.
   I. Through Penetrating Product* — Any cables, Metal-Clad Cable+ or Armored Cable+ currently Classified under the Through Penetrating Products category.
3. Fill, Void or Cavity Material*— Sealant — Fill material applied within the annulus, flush with both surfaces of wall. A min 5/8 in. (16 mm) thickness of sealant is required for the 1 or 2 hr F Rating. A min 1 in. (25 mm) thickness of sealant is required for the 3 hr F Rating. An additional 1/2 in. (13 mm) diam bead of fill material shall be applied at the point contact location of cable bundle/gypsum board interface on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 or FS-One Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Hilti Firestop Systems

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Figure 2.4: Firestop System Detail

With a non-rated roof assembly, it would not be possible for head-of-wall joints to comply with Section 715. Fortunately, IBC Section 707.9 allows that joints between a fire barrier and non-rated roof or wall assemblies are to be protected with less stringent methods. It is only required that an approved system or material be installed that is secured in place, can retard the passage of flame and hot gases, and accommodate building movement. In practice, there are no readily available means to represent that these requirements have been met without referring to tested and listed

assemblies. A performance-based design will be performed in Section 8 to offer a means of satisfying these requirements.

Summary

The selection of Type II-B construction exceeds the IBC requirements given the size and layout of the Student Center. It also seems to have allowed the designers more flexibility in specifying an aesthetically pleasing and functional space. This analysis concludes that the requirements of the 2015 IBC in regards to structural fire protection features have been satisfied.

Given a safe framework, the next task is to consider the interior environment in which occupants will reside. For most occupants the structural design of a building is of little importance when compared to interior finishes used. In a similar fashion, these interior finishes can be the first factor that determines the ultimate severity of fire or emergency events.

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 3: Interior Finish and Flammability Assessment

Interior Finish and Flammability Assessment

All the efforts to provide a safe built environment against fire can be undone if a relatively small fire event negatively impacts occupant well-being. One potential hazard that could precipitate this scenario involves the interior finish materials used within the built environment. Flammability of interior finish materials must be taken into account to avoid the use of materials that would generate excessive amounts of toxic products, smoke, and heat in the presence of a fire exposure. In this section the prescriptive code requirements regulating the use of interior finish materials are examined and applied to the Student Center.

While it is beneficial to apply the prescriptive requirements to interior finish, a life safety design professional should also be aware of the test standards that provide the foundation for the code requirements. Many times, the ratings assigned to wall assemblies or to wall coverings are hard to appreciate without understanding the means by which such ratings are granted. Therefore, this section will also provide comments on those test standards which have the largest footprint on the built environment: ASTM E84 and ATSM E119/UL 263.

Code Requirements for Interior Ceiling and Wall Finishes

Chapter 8 of the IBC details interior finish requirements. Section 803.1 requires wall and ceiling finishes to be classified by one of three test methods: ASTM E84, NFPA 286, or NFPA 265. NFPA 286 and NFPA 265 have pass/fail criteria and do not rank materials. ASTM E84 indexes materials into one of three categories. Figure 3.1 below is an excerpt from the IBC showing the ASTM E84 index categories.

803.1.1 Interior wall and ceiling finish materials.

Interior wall and ceiling finish materials shall be classified in accordance with ASTM E84 or UL 723. Such *interior finish* materials shall be grouped in the following classes in accordance with their flame spread and *smoke-developed indexes*.

Class A:	=	Flame spread index 0-25; smokedeveloped index 0-450.
Class B:	=	Flame spread index 26-75; smokedeveloped index 0-450.
Class C:	=	Flame spread index 76-200; smokedeveloped index 0-450.

Figure 3.1: IBC Section 803.1.1 Excerpt

There is an exemption in Section 803.2 that could apply to wall and ceiling coverings at the Student Center. The exemption states that materials with a thickness less than 0.036" need not be tested to the aforementioned standards and can be used without limitation.

Other requirements of Chapter 8 should be considered if any of the following wall or ceiling finishes are used:

- Foam Plastics
- Textile Coverings
- Vinyl Coverings
- High-density Polyethylene Coverings

- Polypropylene Coverings

IBC Section 803.11 and Table 803.11 specify the finish requirements with respect to ASTM E84 based on occupancy. A snapshot of Table 803.11 with red markups to indicate the applicable requirements is provided in Table 3.1 below.

Table 3.1: IBC Table 803.11 Excerpt

TABLE 803.11
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

GROUP	SPRINKLERED[l]			NONSPRINKLERED		
	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]
A-1 & A-2	B	B	C	A	A[d]	B[e]
A-3[f], A-4, A-5	B	B	C	A	A[d]	C
B, E, M, R-1	B	C	C	A	B	C
R-4	B	C	C	A	B	B
F	C	C	C	B	C	C
H	B	B	C[g]	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B[h, i]	A	A	B
I-3	A	A[j]	C	A	A	B
I-4	B	B	B[h, i]	A	A	B
R-2	C	C	C	B	B	C

Finish materials must be securely attached to walls and ceilings per 803.12, and when attached to fire-resistance rated construction must be attached to comply with 803.13.

Code Requirements for Interior Floor Finishes

Interior finish requirements for floors are provided in IBC Section 804. It happens that the IBC exempts what are defined as traditional floor coverings – wood, vinyl, linoleum, or terrazzo – along with resilient floor coverings and floor coverings without fibers from the requirements of 804.2 to 804.4.2.

The IBC requires floor finish and floor covering material to be tested to NFPA 253, which provides a Class I or Class II rating to floor coverings. All occupancies shall have interior floor finish materials comply with the "pill test" (CPSC 16 CFR Part 1630). The Student Center floor finish materials must also gain a Class II rating per NFPA 253.

Code Requirements for Acoustical Ceiling Systems

The use of a drop-ceiling in the Student Center triggers the need to adhere to IBC Section 808. This section is not prohibitive, specifying that installation of such ceilings, "shall conform to generally

accepted engineering practice." Given that the drop-ceiling is not part of a fire resistance rated floor/ceiling assembly, IBC Section 808.1.1.1 requires installation in accordance with ASTM C635 and ASTM C636.

Flammability Assessment

Design professionals are faced with a multitude of test requirements when planning for fire and life safety. This makes it difficult to be fully aware of the test procedures and the resources that the testing and listing agencies provide for understanding the test results. In this section ASTM E84 and ASTM E119/UL 263 are examined more closely. The goal is to motivate an appreciation for a better understanding of the test standards governing the built environment

ASTM E84

ASTM E84, also known as the Steiner Tunnel Test, is a flame spread assessment test. Equivalent test standards include NFPA 255. The result of the test is a flame spread and smoke development index that is assigned to the material tested.

The test procedure involves a specimen at a standard size mounted to the ceiling of the test enclosure. On one end, the sample is exposed to a 79 kW gas burner, and air is forced through the apparatus at a rate of 1.2 meters/second. The test ranks materials along an index of 0 to 100. The rating of 0 is set by the flame spread and smoke development character exhibited by inorganic cement board. The rating of 100 relates to the flame spread and smoke development of red oak flooring.

The NFPA Handbook, in Section 2 Chapter 5, raises the following concerns with ASTM E84: the requirement to mount the test specimen on the ceiling, limited ability to test materials which may melt and drip, and limited ventilation for polymer foams (ventilation limited conditions). The Handbook states: "While values obtained from this apparatus have been used for regulatory purposes over the last several decades, its relationship to real-world applications has not been established."

Moreover, ASTM E84 does not test specimens in the configuration or size in which the materials are expected to be produced and/or used.

These notes should make a life safety design professional cautious when considering the flammability of materials which he or she is unfamiliar with. Although ASTM E84 is currently the most established tool for comparing flammability characteristics, the test standard may not provide a reasonable degree of assessment in high-risk situations.

ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials/UL 263

ASTM E119/UL 263 is perhaps the most influential test standard in the construction industry. It is responsible for assigning fire resistance ratings to entire assemblies and to construction materials. Underwriters Laboratories (UL) provides an extensive online database of assemblies tested to this standard, and even provides guide information that helps users understand the test, exceptions, and clarifications. This test involves exposing construction assemblies or materials to a test enclosure

held at specific temperature, pressure, and loading conditions. The time during which the test specimens perform to a satisfactory level determines the fire resistance rating of the specimen.

ASTM E119 uses what is called the "standard time-temperature curve" as shown in Figure 3.2 below taken from the NFPA Handbook.

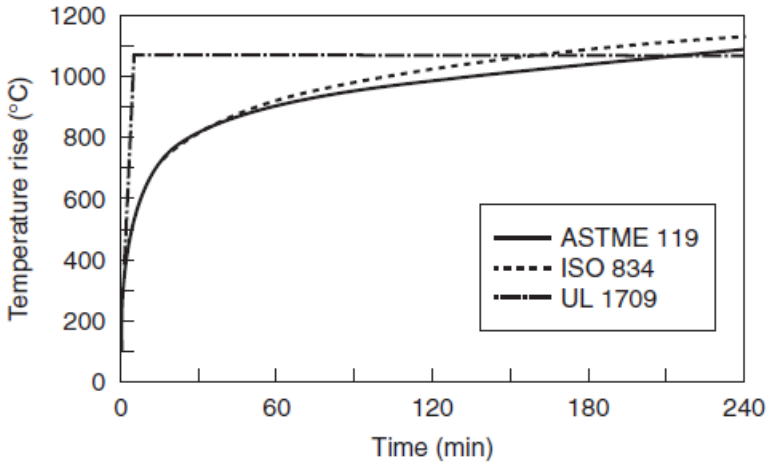

FIGURE 2.5.2 Three Commonly Used Time-Temperature Curves (Courtesy Southwest Research Institute)

Figure 3.2: NFPA Handbook Figure 2.5.2

The time-temperature curve itself is ubiquitous in fire testing, forming the basis of other test standards such as UL 1479 for firestop through penetration systems and UL 2079 for fire resistance rated joint systems.

Acceptance criteria can vary depending on what is being tested. For example, wall assemblies are subject what is called a hose stream test after the furnace test has been completed. Wall assemblies also are evaluated for the passage of flame. Beams, columns, and other structural members are tested primarily for temperature and loading criteria.

The main idea to emphasize is that ASTM E119 has many requirements specific to the assembly or material being tested. For this reason, the design professional should consult the test agency's guide information to understand how the assembly he or she must evaluate is handled. Over time, one can develop a sense for what the fire resistance ratings actually mean for the many different types of assemblies encountered.

Summary

Interior finishes will need to be monitored to ensure compliance with the basic prescriptive requirements discussed above throughout the life of the building. Moreover, if materials that can

pose significant fire risk are used, the assessment of their impact on fire safety should go beyond the prescriptive requirements. It may be necessary to limit the use of materials that are otherwise acceptable to prescriptive requirements.

Discussion so far has encompassed the elements that comprise a built environment. It is now time to consider the fire protection systems that are used to safeguard the built environment. Automatic fire sprinklers will be the first topic in this category.

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 4: Automatic Fire Sprinkler System

Automatic Fire Sprinkler System

Contemporary fire sprinkler design is based upon the principle of preventing the spread of fire beyond the immediate area of origin until the fire can be extinguished, either by the fire sprinkler system alone or with intervention from firefighting personnel. The term "fire control" is used in Section 16, Chapter 1 of the NFPA Handbook. This text discusses the need for an energy balance to exist between the combined cooling and heat absorption effects from fire sprinklers with the evolution of heat from the combustion process. This section will review the fire sprinkler system design requirements for the Student Center to verify that the sprinkler system can meet prescriptive code requirements.

Code Requirements for Automatic Sprinklers in New Buildings

Group A-2 occupancy classification means that the Student Center is required to have an automatic sprinkler system as provided in IBC Section 903.2.1.2 (1) and (2).

IBC Section 903.3.1.1 provides that NFPA 13 shall be the controlling standard for fire sprinkler design where sprinklers are required.

A wet pipe fire sprinkler system has been designed for the Student Center. The wet pipe style of system uses sprinklers fed by a network of piping which is continuously filled with water under pressure. Energy is imparted to the water from the pressure of the water source(s) feeding the system. In this case the municipal water supply is the sole source for water. Details regarding these components will be visited within this report. Fire sprinkler system design documents are provided in Figure 4.1 below. These documents detail the layout, components, and installation practices of the sprinkler system.

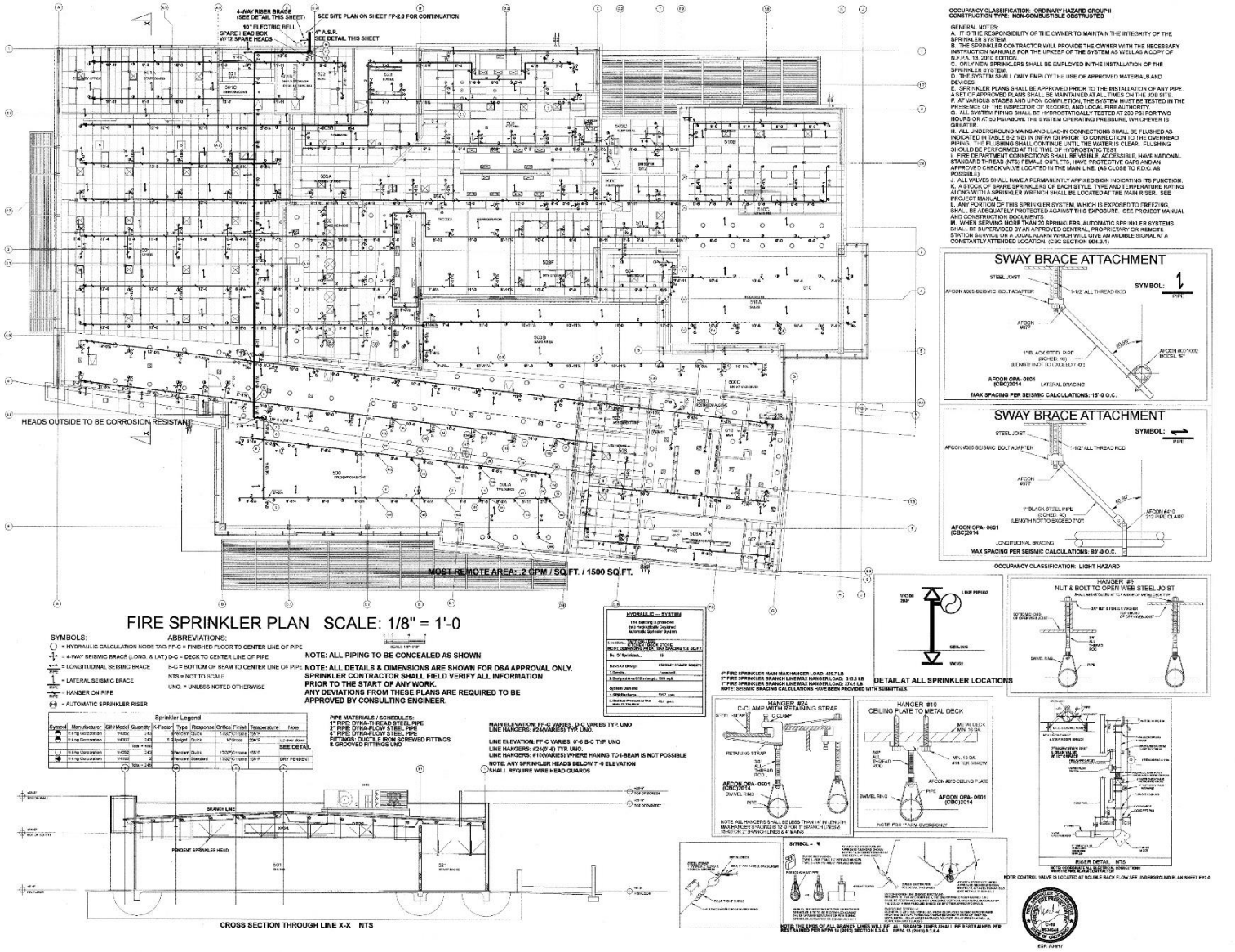

Figure 4.1: Fire Sprinkler Design Sheets (1 of 2)

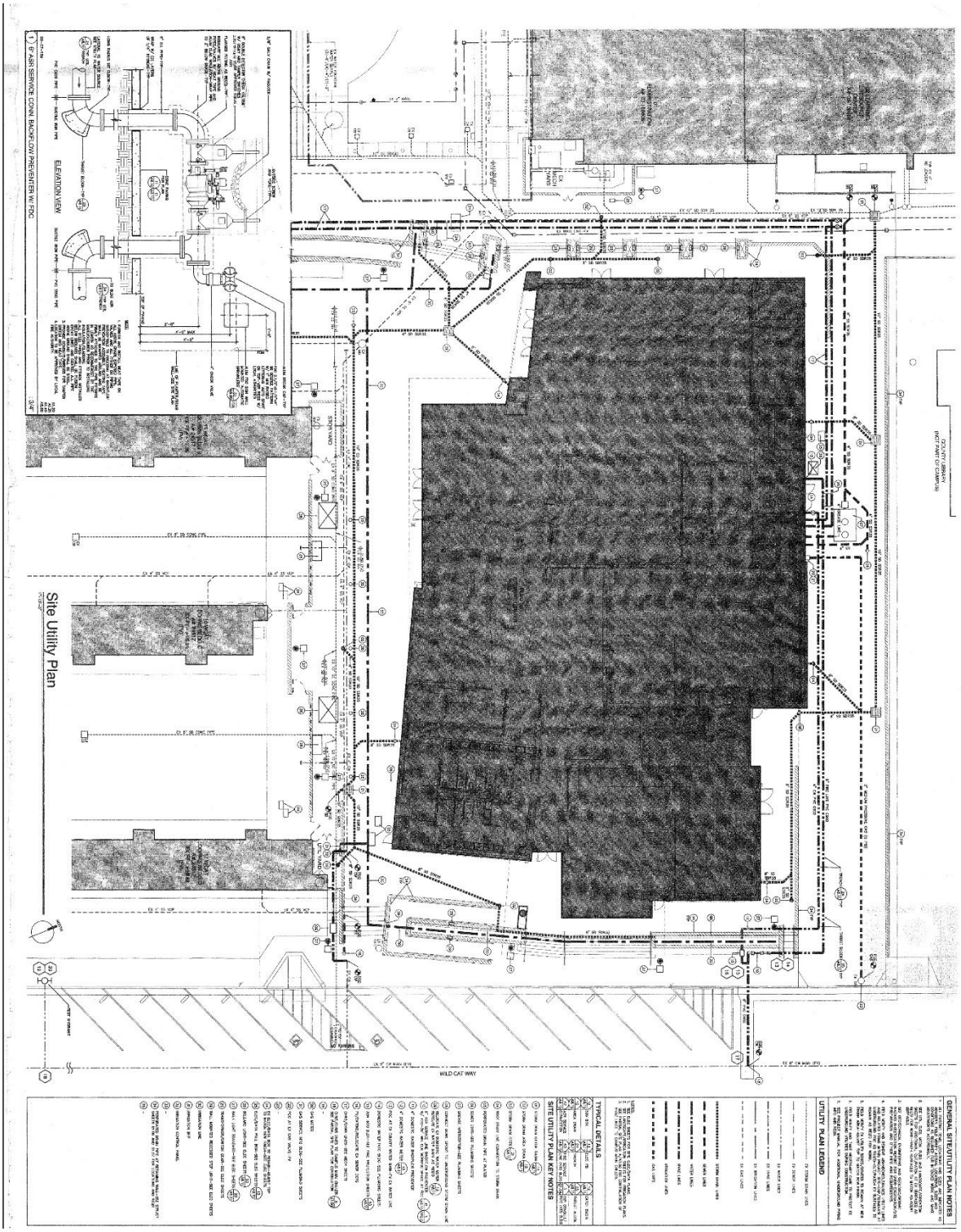

Figure 4.1: Fire Sprinkler Design Sheets (2 of 2)

Water Supply Analysis

Water will be supplied to the sprinkler system by the municipal water system only, which is justified with NFPA 13 Section 24.2.1 (1). The tie-in occurs on the East side of the building and utilizes a 6" PVC pipe. Figure 4.2 illustrates this connection.

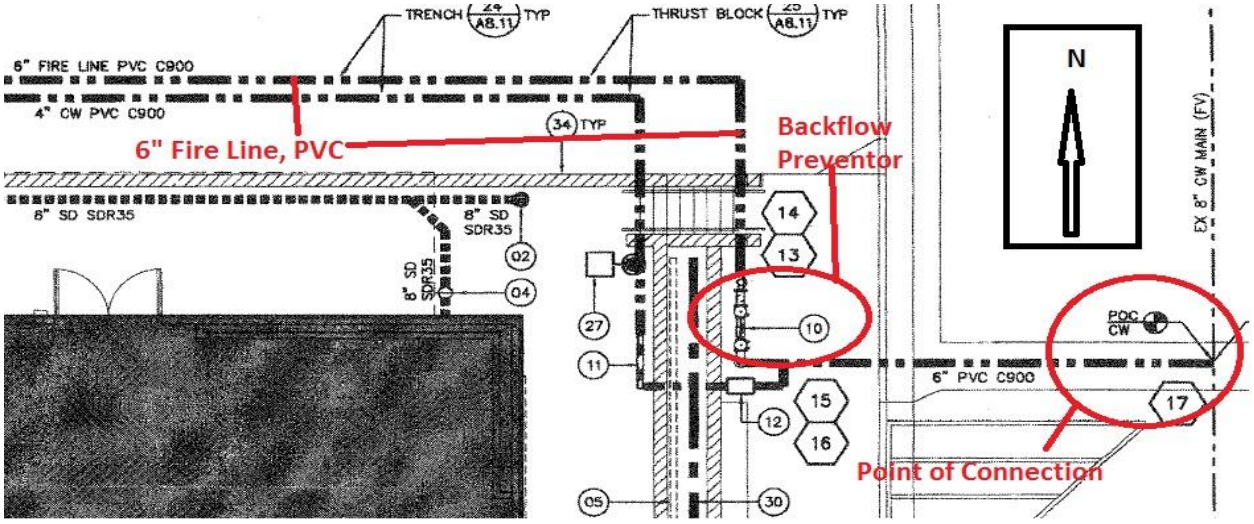

Figure 4.2: Fire Sprinkler Tie-in to Municipal Water Source

A backflow preventer is installed and also shown on the above graphic. This device prevents polluted fire sprinkler water from flowing into the domestic water lines. A manufacturer of such pipe, PW Pipe, publishes a Hazen-Williams C-value of 150 for the PVC C900 pipe. The internal diameter of the pipe depends on the class of pipe chosen. The hydraulic calculations to follow later assume the use of Class 100 DR 25 6" PVC pipe, which has an internal diameter of 6.31". Use of this internal diameter is also in agreement with NFPA 13 Table 23.4.4.8.1 for plastic pipes.

Project plans indicate that flow test data for the water supply reported a static pressure of 63psi and a residual pressure of 28 psi with approximately 1540 gpm flowing. The test was made at a fire hydrant near the property line of the Student Center. The fire sprinkler plans need to be supplemented with a summary of the test details in order to comply with Section NFPA 13 23.2.1 Given that this is the best data available, it will be used for this report. The reader should note that if the reported data changes, the remainder of the supply vs. demand analysis will be impacted.

Given that the water supply information is based on a fire hydrant flow test, NFPA 291 is used to provide the basis for water supply analysis. Section 4.10.1.2 and Equation 4.10.1.2 make it possible to generate a water supply curve based on the information from the fire hydrant flow test. Table 4.1 provides a summary of the data generated.

This data is reported on Figure 4.3 below, which is designed to be in accordance with NFPA 13 23.3.5.3 and to be a satisfactory substitute to the Figure 23.3.5.1.2(b): Flow Test Summary Sheet.

Table 4.1: Hydrant Flow Test Results	
Reported Hydrant Flow Test Results	
Static Pressure (PSIG):	62
Residual Pressure (PSIG):	28
Flow Rate (GPM):	1540
Expected Flow(GPM)	**Residual Pressure (PSIG)**
0	62
547	57
795	52
990	47
1156	42
1304	37
1439	32
1564	27
1681	22
1792	17

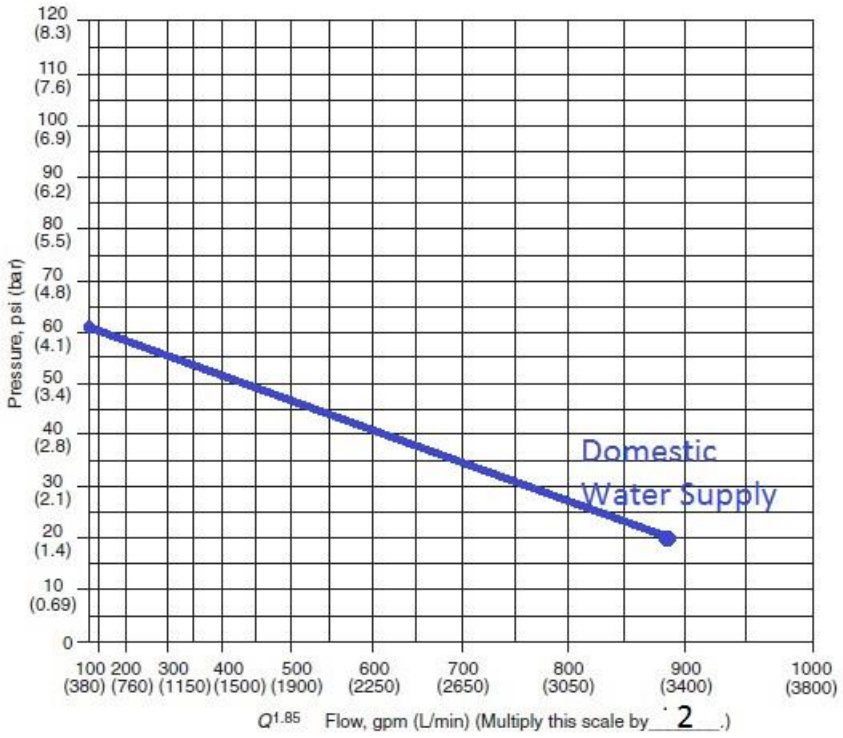

FIGURE A.23.3.4 Sample Graph Sheet.

Figure 4.3: Water Supply Curve

Fire Sprinkler System Design Requirements

NFPA 13 provides the requirements for the design of fire sprinkler systems. The basic framework to fire sprinkler design is to:

1. Identify the occupancy/hazard group for the most hazardous conditions expected. This occupancy/hazard classification is to apply to the fire sprinkler system only in accordance with NFPA 13 Sections 5.1.1 and 5.1.2.
2. Select a design approach for determining water demand. NFPA 13 Section 11.1.4.1 provides three different approaches available for selection.
3. Provide hydraulic calculations demonstrating that the available water supply(s) are adequate to meet the calculated demand. Calculation guidelines are provided in NFPA 13 Chapter 23.

Given that the Student Center will contain a moderate amount of temporary storage and permanent displays, the building is classified as Ordinary Hazard (Group 2) in accordance with NFPA 13 5.3.2.1. For operational purposes the maximum storage height for books, cooking oils, and other items with high heat release rates must be limited to 8 ft. in height. Other items having moderate heat release rates may be stored up to 12 ft. in height.

The design team has chosen an occupancy hazard fire control approach as allowed in Section 11.1.4. Furthermore, the design team will use the hydraulic calculation method per Section11.2.1.1 and detailed in Section 11.2.3. This section then provides three methods for determining sprinkler water demand in Section 11.2.3.1.1. Method (1) is chosen, which involves the use of density/area curves and the density/area method of Section 11.2.3.2.

Sprinkler demand can then be determined by selecting any point on the appropriate curve presented in Figure 11.2.3.1.1 in accordance with Section 11.2.3.2.1.2. The selection made is illustrated in Figure 4.4 below, and gives a theoretical sprinkler demand of 300 gpm.

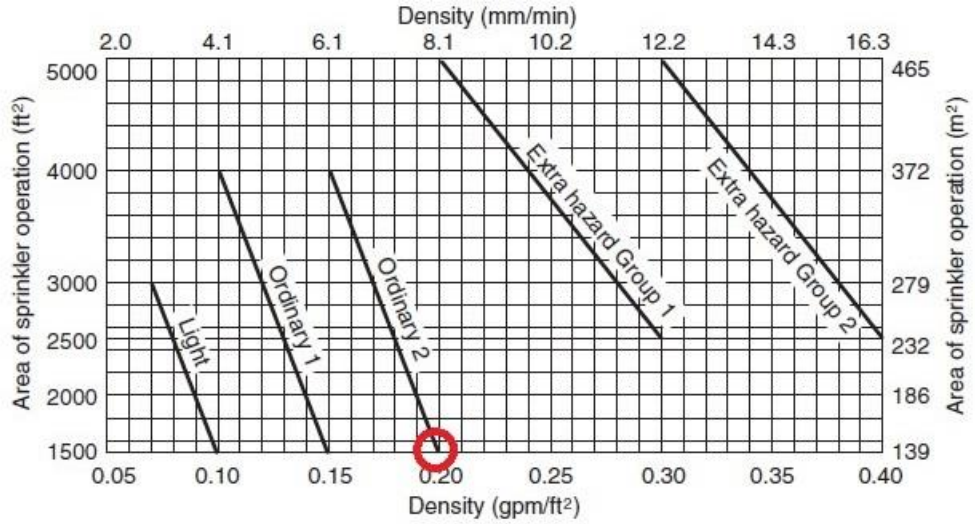

FIGURE 11.2.3.1.1 Density/Area Curves.

Figure 4.4: NFPA 13 Figure 11.2.3.1.1

Quick response sprinklers are planned for the Student Center, and Section 11.2.3.2.3.1 provides an opportunity to reduce the design area of the figure above. However, the design team has not indicated that this factor is to be used, and hydraulic calculations were done based upon the full 1500 sq. ft. design area.

Section 11.2.3.1.2 also requires additional water supply requirements in Table 11.2.3.1.2. The portions of that table relevant to this project are shown in Table 4.2 below.

Table 4.2: NFPA 13 Figure 11.2.3.1.1

Table 11.2.3.1.2 Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems

Occupancy	Inside Hose		Total Combined Inside and Outside Hose		Duration (minutes)
	gpm	L/min	gpm	L/min	
Light hazard	0, 50, or 100	0, 190, or 380	100	380	30
Ordinary hazard	0, 50, or 100	0, 190, or 380	250	950	60–90
Extra hazard	0, 50, or 100	0, 190, or 380	500	1900	90–120

Table 4.2 shows the need to consider an additional demand for fire hose streams that must be a 250 gpm minimum. Therefore, total theoretical system demand is 550 gpm. Now that the demand requirements are met it is useful to consider the equipment that will be used in the fire sprinkler system prior to reviewing the hydraulic calculations.

Fire Sprinkler System Component Identification

Identification of critical sprinkler system components follows.

Sprinklers are to be installed above and below the drop ceiling as shown in Figure 4.5 below.

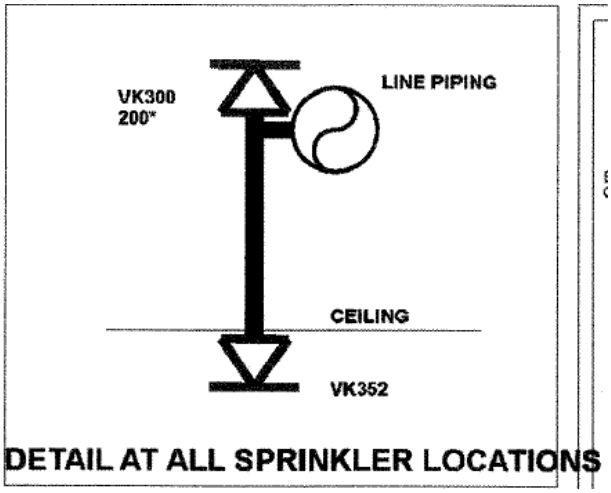

Figure 4.5: Fire Sprinkler Detail at Ceiling Level

Sprinkler distribution piping is to consist of Dyna-Flow steel pipe manufactured by National Fire Equipment Ltd. Sizes consist of 1", 2" and 4" pipe.

The diagram of the riser is unsatisfactory due to the blurred condition. The fire sprinkler designer should provide a better graphic of the riser. What is available is presented in Figure 4.6 below with markups to help distinguish pipe sizes and types. It should be noted that the 6" stainless steel pipe is regular schedule 40 steel pipe, not the Dyna-Flow series of pipe.

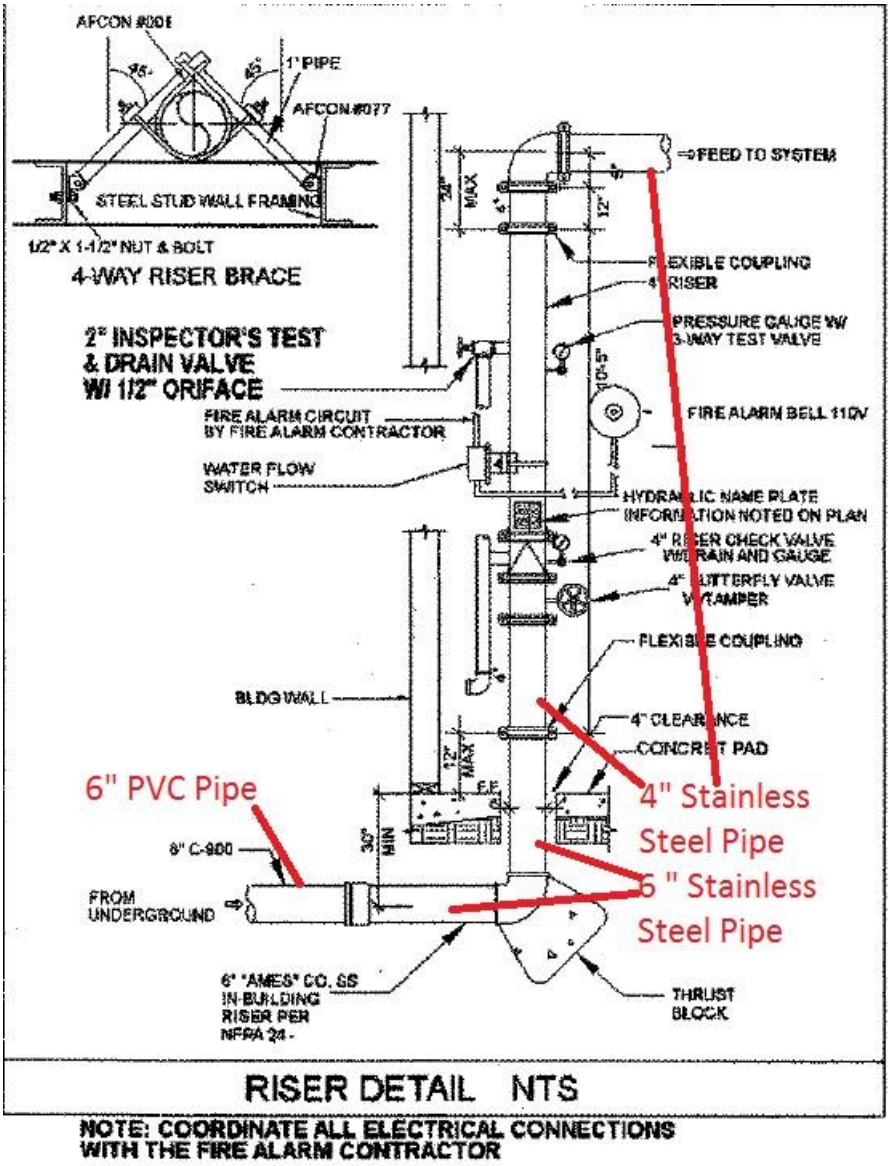

Figure 4.6: Fire Sprinkler Riser Detail

Figure 4.7 shows the location of the system riser at the north of the building, branch lines, cross-main, and sprinklers.

IBC Section 903.4 sets forth requirements for sprinkler supervision and alarms. The main control valve and the water flow switch must both be electrically supervised by a control unit listed for that purpose. These devices are discussed in more detail when the fire alarm system is considered.

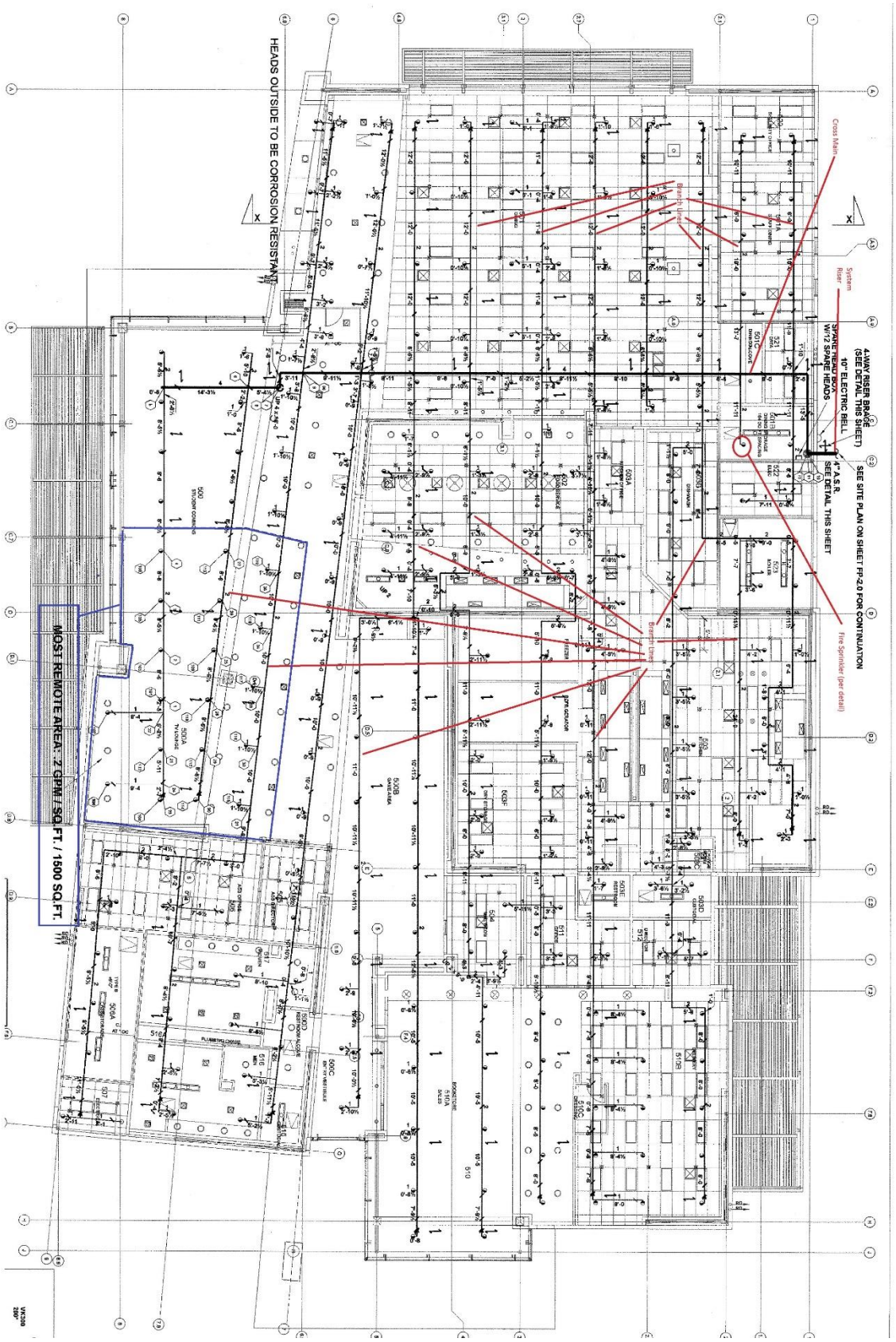

Figure 4.7: Fire Sprinkler Components

Hydraulic Calculations

Calculations are to follow the procedures set forth in NFPA 13 Chapter 23. Section 23.4.4.2 provides that the design area is a rectangle with a dimension equal to 1.2 times the square root of the protected area.

$$L = 1.2 * \sqrt{1500[sq.ft.]} = 46.48[ft]$$

Ideally, the spacing of sprinklers in the most hydraulically remote area would fall on a nice grid pattern, such as 10 ft. between sprinklers on a branch line and 10 ft. between branch lines. However, this is not the case for the most remote area in the Student Center. The area chosen by the design team is shown on a portion of the sprinkler plans in Figure 4.8 below.

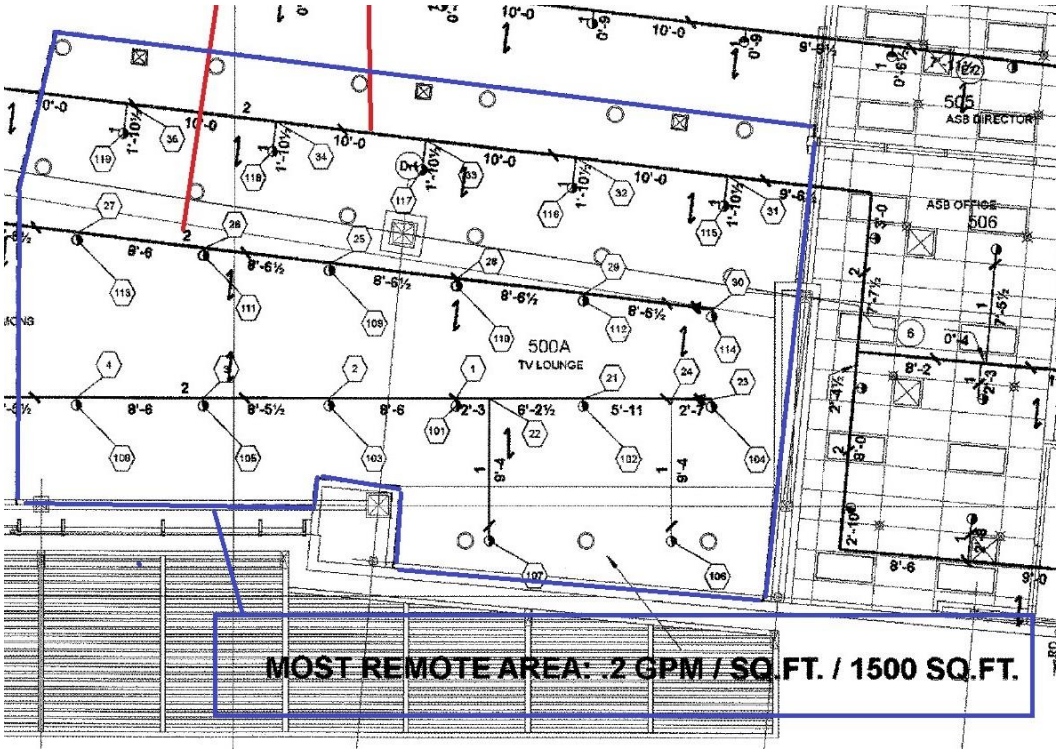

Figure 4.8: Selection of Remote Area for Hydraulic Calculations

This 1500 sq. ft. area is in the Student Center TV Lounge and includes 19 sprinklers. The calculations show a system demand of 535 gpm and a pressure of 45 psi, but a calculation worksheet was not provided. To verify what the fire sprinkler designer has reported the correct demand, hydraulic calculations for the remote area chosen were performed. These hydraulic calculations are shown in Table 4.3 below.

Table 4.3: Fire Sprinkler Hydraulic Calculations (1 of 4)

Project Name: Taft Community College, New Student Center - Fire Sprinkler Hydraulic Calculations
Sheet 1 of 4: Calculations for Branch Line 5 Date: 5/1/2017

Step No.	Node Ident and Location	Flow in gpm		Pipe size (in)	Pipe Fittings and Devices	Equivalent Pipe Length		Friction loss (psi/ft)		Pressure Summary		Normal Pressure		Notes: Design Density = 0.20 K = 5.6 Hazen-Williams C-value:	
1	106-24	q		1	2"Tee	L	9.3	C=	120	Pt	7.0	Pt		k=	8
						F	10			Pe		Pv			q = k * (Pt)^1/2
		Q	21.2			T	19.3	pf	0.145	Pf	2.8	Pn		Q	21.2
2	23-24	q	21.2	2		L	2.583	C=	120	Pt	9.8	Pt		k_eq	6.76
						F				Pe		Pv		Q=	21.16601049
		Q	42.3			T	2.583	pf	0.019	Pf	0.049	Pn			
	NOT USED	q	0.0			L	-	C=	-	Pt	-	Pt			
						F				Pe		Pv			NOT USED
		Q	0.0			T	-	pf	-	Pf	-	Pn			
3	24-21	q	0.0	2		L	5.92	C=	120	Pt	9.8	Pt			
						F				Pe		Pv			
		Q	42.3			T	5.92	pf	0.02	Pf	0.1	Pn			
4	21-22	q	25.2	2		L	6.46	C=	120	Pt	10.0	Pt		k=	8
						F				Pe		Pv		Q=	25.2
		Q	67.6			T	6.46	pf	0.438	Pf	2.8	Pn			
5	22-1	q	24.2	2		L	2.25	C=	120	Pt	12.8	Pt			Flow from branch
						F				Pe		Pv			line, Node 107
		Q	91.8			T	2.25	pf	0.08	Pf	0.18	Pn		Q=	24.2
6	1-2	q	28.8	2		L	8.5	C=	120	Pt	13.0	Pt		k=	8
						F				Pe		Pv		Q=	28.8
		Q	120.6			T	8.5	pf	0.133	Pf	1.1	Pn			
7	2-3	q	0.0	2		L	8.46	C=	120	Pt	14.1	Pt			
						F				Pe		Pv			
		Q	120.6			T	8.46	pf	0.13	Pf	1.12	Pn			
8	3-4	q	31.2	2		L	8.5	C=	120	Pt	15.2	Pt		k=	8
						F				Pe		Pv		Q=	31.2
		Q	151.8			T	8.5	pf	0.20	Pf	1.73	Pn			
9	4-5	q	32.9	2	4"Tee	L	25.4	C=	120	Pt	16.9	Pt		k=	8
						F	20			Pe		Pv		Q=	32.9
		Q	184.7			T	45.4	pf	0.29	Pf	13.28	Pn			
	Summary	**q**				**L**		**C=**		**Pt**	**30.2**	**Pt**			
						F				**Pe**		**Pv**			
		Q	**184.7**			**T**		**pf**		**Pf**		**Pn**			

Table 4.3: Fire Sprinkler Hydraulic Calculations (2 of 4)

Project Name: Taft Community College, New Student Center - Fire Sprinkler Hydraulic Calculations
Sheet 2 of 4 : Calculations for Branch Line 6 — Date: 5/1/2017

Step No.	Node Ident and Location	Flow in gpm		Pipe size (in)	Pipe Fittings and Devices	Equivalent Pipe Length		Friction loss (psi/ft)		Pressure Summary		Normal Pressure		Notes: Design Density = 0.20 K = 5.6 Hazen-Williams C-value:	
1	30-29	q		2		L	8.5	C=	120	Pt	7.0	Pt		k=	8
						F				Pe		Pv			q = k * (Pt)^1/2
		Q	21.2			T	8.5	pf	0.005	Pf	0.04	Pn		Q	21.2
2	29-28	q	21.2	2		L	8.54	C=	120	Pt	7.0	Pt		k=	8
						F				Pe	7.9	Pv		Q=	21.2
		Q	42.4			T	8.54	pf	0.019	Pf	0.2	Pn			
3	28-25	q	21.5	2		L	8.54	C=	120	Pt	7.2	Pt		k=	8
						F				Pe		Pv		Q=	21.5
		Q	63.9			T	8.54	pf	0.041	Pf	0.4	Pn			
4	25-26	q	22.0	2		L	8.54	C=	120	Pt	7.6	Pt		k=	8
						F				Pe		Pv		Q=	22.0
		Q	85.9			T	8.54	pf	0.07	Pf	0.6	Pn			
5	25-27	q	22.9	2		L	8.50	C=	120	Pt	8.2	Pt		k=	8
						F				Pe		Pv		Q=	22.9
		Q	108.7			T	8.50	pf	0.110	Pf	0.9	Pn			
6	27-6	q	0.0	2	4"Tee	L	27.8	C=	120	Pt	9.1	Pt			
						F	20			Pe		Pv			
		Q	108.7			T	47.8	pf	0.11	Pf	5.24	Pn			
		q				**L**		**C=**		**Pt**	**14.3**	**Pt**			
						F				**Pe**		**Pv**			
		Q	**108.7**			**T**		**pf**		**Pf**		**Pn**			

Table 4.3: Fire Sprinkler Hydraulic Calculations (3 of 4)

Project Name: Taft Community College, New Student Center - Fire Sprinkler Hydraulic Calculations
Sheet 3 of 4 : Calculations for Branch Line 9 — Date: 5/1/2017

Step No.	Node Ident and Location	Flow in gpm		Pipe size (in)	Pipe Fittings and Devices	Equivalent Pipe Length		Friction loss (psi/ft)		Pressure Summary		Normal Pressure		Notes: Design Density = 0.20 K = 5.6 Hazen-Williams C-value:	
1	115-31	q	21.2	1	2" Tee	L	1.9	C=	120	Pt	7.9	Pt		k=	8
						F	10			Pe		Pv		Q	21.2
		Q	21.2			T	11.9	pf	0.145	Pf	1.72	Pn		k_eq	6.8
2	31-32	q	21.2	2		L	10.00	C=	120	Pt	9.6	Pt		k_eq	6.8
						F				Pe		Pv		Q=	21.2
		Q	42.3			T	10.00	pf	0.019	Pf	0.2	Pn			
3	32-33	q	21.4	2		L	10.00	C=	120	Pt	9.8	Pt		k_eq	6.8
						F				Pe		Pv		Q=	21.4
		Q	63.7			T	10.00	pf	0.041	Pf	0.4	Pn			
4	33-34	q	21.8	2		L	10.00	C=	120	Pt	10.2	Pt		k_eq	6.8
						F				Pe		Pv		Q=	21.8
		Q	85.5			T	10.00	pf	0.07	Pf	0.7	Pn			
5	34-36	q	22.6	2		L	10.00	C=	120	Pt	10.9	Pt		k_eq	6.8
						F				Pe		Pv		Q=	22.6
		Q	108.1			T	10.00	pf	0.108	Pf	1.1	Pn			
6	36-9	q	0.0	2	4"Tee	L	33.7	C=	120	Pt	12.0	Pt			
						F	20			Pe		Pv			
		Q	108.1			T	53.7	pf	0.11	Pf	5.82	Pn			
		q				**L**		**C=**		**Pt**	**17.8**	**Pt**			
						F				**Pe**		**Pv**			
		Q	**108.1**			**T**		**pf**		**Pf**		**Pn**			

Table 4.3: Fire Sprinkler Hydraulic Calculations (4 of 4)

Project Name: Taft Community College, New Student Center - Fire Sprinkler Hydraulic Calculations																	
Sheet 4 of 4: Calculations for Cross Main to Bottom of Riser (B.O.R.)														Date:		5/1/2017	
Step No.	Node Ident and Location	Flow in gpm		Pipe size (in)	Pipe Fittings and Devices	Equivalent Pipe Length		Friction loss (psi/ft)		Pressure Summary		Normal Pressure		Notes: Design Density = 0.20 K = 5.6 Hazen-Williams C-value:			
1	5-6	q	0.0	4		L	14.3	C=	120	Pt	30.2	Pt					
						F				Pe		Pv					
		Q	184.7			T	14.3	pf	0.011	Pf	0.16	Pn					
2	6-7	q	158.4	4	4" Elbow	L	5.38	C=	120	Pt	30.4	Pt		k_eq	28.7		
						F	10			Pe	2.1	Pv		Q=	158.4		
		Q	343.1			T	5.38	pf	0.036	Pf	0.2	Pn					
3	7-9	q	0.0	4	2x4" Elbow	L	6.42	C=	120	Pt	32.6	Pt					
						F	20			Pe		Pv					
		Q	343.1			T	26.42	pf	0.036	Pf	0.9	Pn					
4	9-10	q	148.4	4	2x4" Elbow	L	98.54	C=	120	Pt	33.6	Pt		k_eq	25.6		
						F	20			Pe		Pv		Q=	148.4		
		Q	491.5			T	118.54	pf	0.07	Pf	8.2	Pn					
5	10-11 B.O.R	q	0.0	4	4" Elbow	L	12.00	C=	120	Pt	41.8	Pt		k_eq	0.0		
						F	10			Pe	5.2	Pv		Q=	0.0		
		Q	491.5			T	22.00	pf	0.067	Pf	1.5	Pn					
		q				**L**		**C=**		**Pt**	**48.5**	**Pt**					
						F				**Pe**		**Pv**					
		Q	**491.5**			**T**		**pf**		**Pf**		**Pn**					

Calculated sprinkler demand was found to be 491 gpm with a residual pressure of 48.5 psig at the riser. Calculated demand is lower than reported on the project sheets, which shows 535 gpm demand. The calculated residual pressure is higher than reported on the project sheets which report a residual pressure of 46.1 psig. It is not possible to identify the difference between the two calculations without the original hydraulic calculation forms corresponding to the project sheets. For now, the more stringent demand will be used. This demand is plotted along with the water supply curve and the hose stream allowance curve on Figure 4.9. The result is that the available supply meets the calculated water demand of the fire sprinkler system and hose streams.

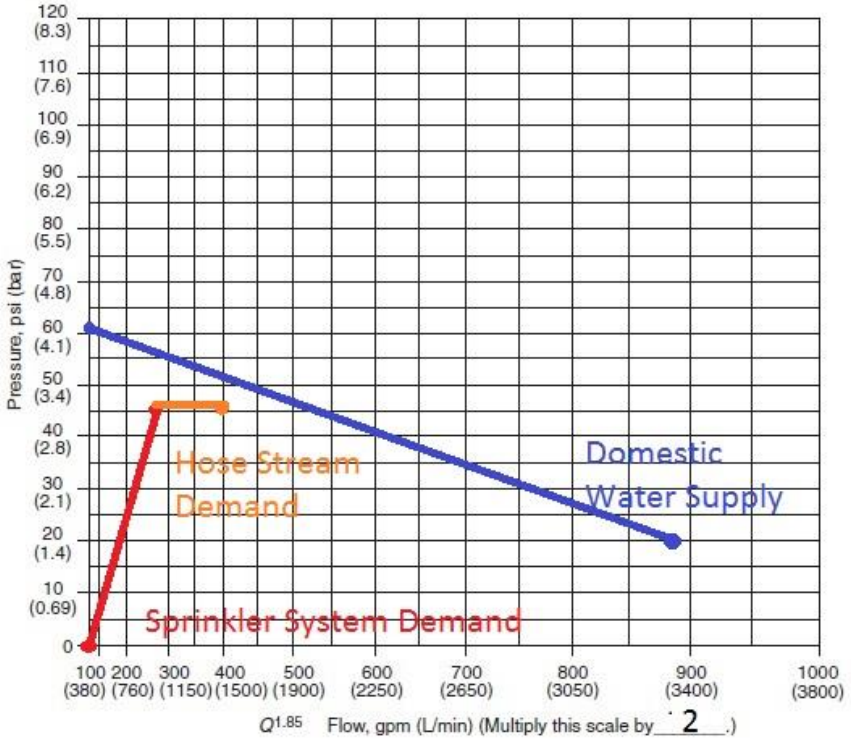

FIGURE A.23.3.4 Sample Graph Sheet.

Figure 4.9: Fire Sprinkler Supply vs Demand

Inspection, Testing, and Maintenance Requirements

NFPA 13 Chapter 25 provides the guidelines for acceptance testing of fire sprinkler systems. A hydrostatic test will be required for wet pipe system at the Student Center. The test procedure is outlined in NFPA 13 Section 25.2.1.

The water flow switch will need to be tested via the inspector's test valve per Section 25.2.3.1. This device should generate an audible alarm from the fire alarm system and trigger the electric bell installed by the riser.

The sprinkler control valve should be operated, and it should be verified that a tamper switch is installed on this valve and indicates a trouble condition on the fire alarm panel when the valve is closed.

Plans and forms will need to be submitted that detail the fire sprinkler system characteristics and building information.

Routine inspection and maintenance requirements are detail in NFPA 25. Table 5.1.1.2 provides a summary of the system components that must be inspected, the frequency of inspection, and a reference to specific inspection requirements. For the wet pipe sprinkler system, inspections will need to follow a schedule of 4 inspections per year, with 3 quarterly inspections and one annual inspection. Every 5 years, the annual inspection is to be replaced by a 5-year inspection. The names

quarterly, annual, and 5-year all designate increasing levels of inspection with regards to fire sprinkler system components.

Summary

The fire sprinkler system designed for the Student Center is adequate based upon the system supply exceeding the expected demand. System supply is shown in Table 4.1 and Figure 4.3. Demand is calculated as being 535 gpm at a residual pressure of 46.1 psig. The supply was based upon fire hydrant flow testing that produced a static pressure of 62 psig, and residual pressure of 28 psig, and flow of 1540 gpm at the residual pressure. It will be necessary for the original designer to submit full calculations with regards to the fire sprinkler demand. It will also be necessary to re-verify the water supply requirements and include the results with the fire sprinkler design plan. It is now time to consider the second fire suppression system proposed for the Student Center designed to protect commercial cooking equipment.

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 5: Kitchen Fire Suppression System

Kitchen Fire Suppression System

Commercial cooking operations present a severe fire hazard. The gas or electricity used to power the commercial appliances provide significant amounts of power. Gas can present explosion hazards. Electricity can present shock hazards. Both have been shown to be a reason for life loss of fire service personnel as well as building occupants. For this reason, the need to have a kitchen fire suppression system that suppresses the fire hazard and removes the hazard from gas and electricity is of great importance.

Code Requirements

The IFC makes fire suppression as a means to protect commercial cooking operations mandatory in section 609. Section 904.12 of the IBC provides additional requirements for such systems. For example, Section 904.12.1 provides that a manual pull station that operates the kitchen fire suppression system must be installed, but this pull station should not activate other fire suppression systems.

IBC Section 904.2.2 requires that the exhaust hoods service commercial kitchen equipment also be protected.

Further requirements are provided in NFPA 96 and NFPA 17A. Commercial kitchen fire suppression systems are not the most visible fire suppression system type within the fire protection community. Therefore, the author finds it be helpful to point out important design features for such systems that those unpracticed with their design may overlook.

1. All sources of fuel and heat serving protected cooking appliances must be shut off upon activation of the fire suppression system per NFPA 96 Section 10.4. This is very important because it helps to prevent run-away involvement of the significant fuel loads - oils, fats, and grease – present with commercial cooking appliances. In the case of appliances using gas, shutdown of the gas supply helps prevent an explosion. In the case of appliances powered by electricity, shut down of electrical power helps prevent shock to occupants due to migration of wet chemical agent, and it helps prevent shock to firefighting personnel responding to such fire with hose streams.
2. Requirements for portable fire extinguishers are outlined in NFPA 96 Section 10.10. Notably, a Class K fire extinguisher must be provided when fats and oils are associated with cooking operations.

Kitchen Fire Suppression System Selection

The design team has identified that an Ansul R-102 fire suppression system shall be installed to protect the commercial cooking operations. Figure 5.1 shows an agent cylinder, control unit enclosure, and wet chemical agent of such a system.

Figure 5.1: Ansul R-102 Kitchen Fire Suppression System

This system involves a wet chemical agent store under normal pressure in a cylinder. An expellant gas cylinder provides the driving force for the chemical agent via a releasing mechanism. The releasing mechanism is tied into the detection line and manual pull station line.

Figure 5.2 shows a typical R-102 System Layout

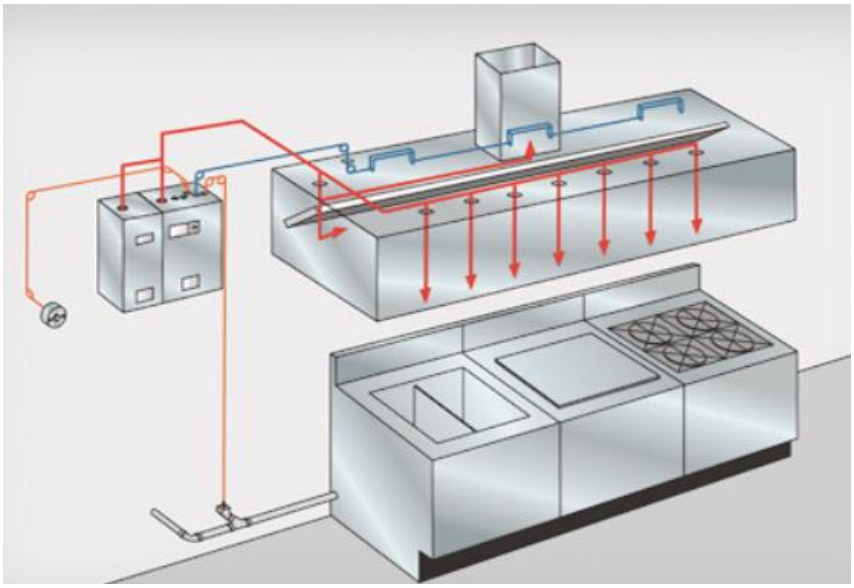

Figure 5.2: Ansul R-102 Kitchen Fire Suppression System Example Layout

The appliances to be installed at the Student Center involve fryers, a griddle, a wok, and multiple ranges. Figure 5.3 shows a schematic of the appliance arrangement.

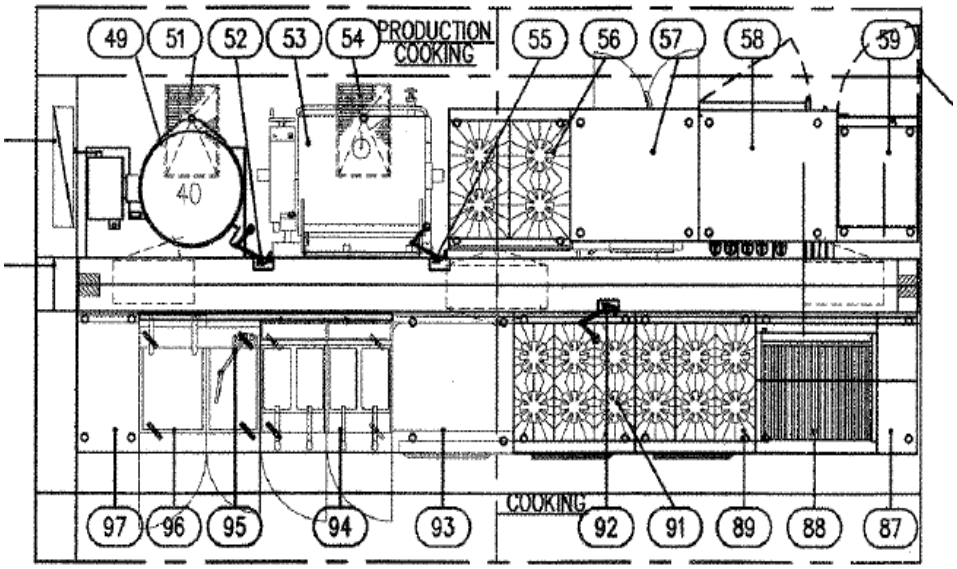

Figure 5.3: Plan View of Kitchen Cooking Appliance Arrangment

Inspection, Testing, and Maintenance

NFPA 17A details the requirements for inspection, testing, and maintenance of kitchen fire suppression systems.

Plans must be submitted to and approved by the authority having jurisdiction. At the time of the acceptance test all components of the system must be visually inspected and pipes checked for tightness. It is also important to verify that the same size and types of cooking appliances that appear on the plans are present onsite, and installed at the same locations as indicated on the plans.

An operational test shall be conducted in accordance with the system manufacturer's guidelines but shall include tests of the automatic detection system, gas shut-off valve, make-up air shut off, and electrical power (to the kitchen hood/appliances) shut off.

Certified technicians must inspect the kitchen fire suppression system at intervals not exceeding six months. Section 7.3.3 provides the minimum requirements of these inspections. Recurring hydrostatic tests of agent cylinders and pressure containers shall occur at least every 12 years.

Summary

The Ansul R-102 is a proprietary pre-engineered fire suppression system. Specific requirements for performing the installation and maintenance of such systems will be contained in the manufacturer's instructions. Only personnel qualified by the manufacturer should perform work on this system.

Both the fire sprinkler system and kitchen fire suppression system having limited means, local horns/bells, to notify building occupants of system activation in response to a fire event. However, both systems are integrated into a fire alarm system. The fire alarm system provides notification throughout the premise and will be discussed in the following section.

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 6: Fire Alarm System

Fire Alarm System

Fire alarm system designs must fulfill important tasks. These include: meaningfully enhance an overall life safety program for the protected location, operate in tandem with multiple building systems, and provide a degree of survivability to guard against failure. This section is aimed at considering the fire alarm system as planned for the new Student Center at Taft Community College.

A fire alarm system can be described as a set of integrated components designed to detect the onset of fire at the earliest stage possible, notify occupants to the danger of a fire, and interact with building processes or components appropriately. The manner in which the system is designed can be guided by three basic protection goals as discussed in the NFPA Fire Protection Handbook, 20th Edition (NFPA Handbook): the preservation of an overall building mission, the protection of property, and a focus on life safety for building occupants. Some element from all three of these goals will be addressed by any fire alarm system, but there are occupancies that may require particular attention to a single item. In the case of the Student Center, the most important protection goal is the life safety of building occupants.

Importance must also be given to designing a fire alarm system so that the system operation is not unduly complicated and maintenance can be performed without disruption of building processes. There must also be a degree of resistance to potential failures of individual components so that the system does not become inoperable. Finally, a number of other considerations, such as future expansion needs, may need to be addressed.

At the Student Center, the scope of the fire alarm project involves adding a new fire alarm system. Specifications for the project require adherence to NFPA 72 and NFPA 90A. Evaluation of the project will be based on the 2013 and 2012 editions of these codes, respectively. In addition, the fire alarm system requirements will be based upon the 2015 International Building Code. The design team has chosen to install an intelligent, addressable fire alarm system controled by a single Notifier NFS2-640 Fire Alarm Control Panel (FACP) shown in Figure 6.1.

Figure 6.1: Notifier NFS2-640 Fire Alarm Control Unit

Fire Alarm Signals

Fire alarm systems are subject to a variety of conditions that can be detected or monitored. Rather than provide a single response to each of the different conditions NFPA 72 Section 10.9 defines four types of signals that fire alarms can generate in response to the monitored conditions: alarm, pre-alarm, supervisory, and trouble. Moreover, Section 10.10.1 mandates that such signals shall be clearly and descriptively distinguished. Each of these signals are discussed in more detail below. Here it should also be noted that accomplishment of the distinctive signals requirement can, in some cases, be satisfied by having the FACP display provide appropriate details as suggested in NFPA 72 Appendix A.10.10.4.

Alarm Signal

A basic requirement of alarm signals is that they be a three-pulse temporal pattern as identified in NFPA 72 Section 18.4.2.1. However, Appendix A.18.4.2.1 provides allowance for fire alarm systems commissioned prior to the 1996 enactment of the three-pulse temporal pattern to continue use of those alarm signals previously installed. The appendix also points out that alarm signals are intended to be used for partial evacuation, building evacuation, and relocation of building occupants.

Pre-Alarm Signal

The requirements for these signals falls to NFPA 72 Section 10.10.8 where it is stated that they shall be distinctive. An example of a usefulness for pre-alarm signals considers a special hazard clean agent fire suppression system. Such systems are designed to protect high value equipment, such as the electronic equipment in a server room. A pre-alarm signal with such a system would allow an operator or the appropriate personnel to assess the situation prior to the release of fire suppression agents. Requirements in such cases are further defined within the relevant standards, such as NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems.

Supervisory Signal

These signals also receive treatment in NFPA 72 Section 10.10.5. A supervisory signal is appropriate for a condition that does not threaten the performance of life safety systems, but is related to such systems. Section 10.13.6 provides further details regarding supervisory signals. However, there is one concept that is not discussed directly: latching versus non-latching supervisory signals. Latching signals are handled in Section 23.8.5.8.2 where it is deemed that latching signals as a response to off- normal conditions and requiring a manual reset of the system to restore them shall not be permitted.

Trouble Signal

Trouble signals are also required to be distinctive per NFPA 72 Section 10.10.6. Section 10.14 provides more substantial detail. This section provisions for intermittent trouble signals, restoration of trouble signals, and deactivation of trouble signals. As described in NFPA 72 Appendix A.10.14.9, trouble signals are designed to remind owners and occupants that the fire alarm system is in fault, which could possibly result in failure.

Fire Alarm System Code Requirements

IBC Chapter 9 provides the requirements for fire protection systems. This includes the requirements for fire alarm systems in new buildings. Section 907.2 requires that new buildings and structures shall have a fire alarm system installed in accordance with NFPA 72. This section also requires that at least one manual pull box (pull station) be installed for fire alarm systems using automatic fire detectors or sprinklers for a means of system initiation.

IBC Section 907.2.1 allows for Group A occupancies with an occupant load between 300 and 1,000 persons to not be designed as a manual fire alarm system when the building is equipped with an automatic sprinkler system. The sprinkler system must be installed in accordance with Section 903.1.1, which the analysis from Section 4 above demonstrates to be the case for the Student Center.

An interesting note is that it is often assumed that fire alarm systems will be equipped with smoke or heat detectors throughout the building. It happens that installation of such devices is not always a code requirement as IBC Section 907.2.1 demonstrates. Nonetheless, there are some minimum requirements that result in the installation of smoke detection at special locations. IBC Section 907.4 contains provisions for such requirements. Section 907.4.1 provides that at least one smoke

detector be installed where a fire alarm control panel, notification appliance circuit extender, and supervising station transmitting equipment is located. Figure 6.2 shows the location of smoke detector installation at the fire alarm control unit and at the notification appliance circuit extenders.

The broad requirements for the fire alarm system in accordance with the 2015 IBC have been identified. Additional requirements for the fire alarm system and fire alarm system components will be discussed in the following sections and will focus on the requirements set forth in NFPA 72 and additional IBC requirements.

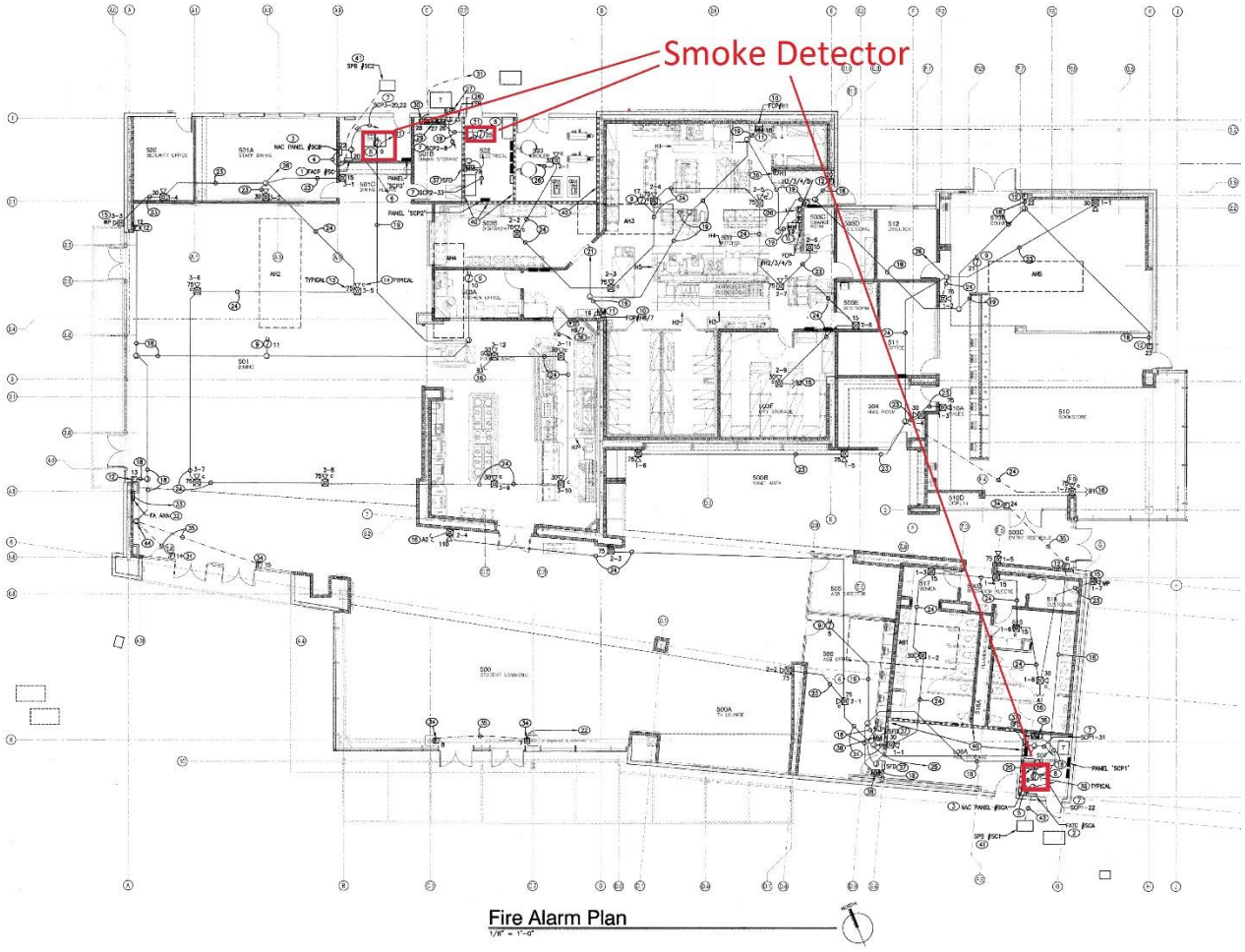

Figure 6.2: Smoke Detector Layout

Fire Alarm System Initiation Devices

Plans submitted for this project contain the description and location of the fire detection devices. Based upon the IBC requirements discussed above, the fire alarm system will contain automatic detection/initiation consisting primarily of fire sprinklers via a water flow switch, manual pull stations at select locations, a fire alarm switch integrated in to the Ansul kitchen fire suppression system.

Smoke detectors consist of photoelectric addressable detectors. They are to be Notifier model FSP-851 and are shown in Figure 6.3

Figure 6.3: Photoelectric Smoke Detector by Notifier

The automatic sprinkler system includes the fire sprinkler flow switch installed on the riser and a fire sprinkler tamper switch installed on the main control valve. The flow switch is designed as a means to indicate an alarm condition due to sprinkler flow. An example flow switch is shown in Figure 6.4 below. The tamper switch, Figure 6.5 below, is designed to allow for a trouble condition to be indicated on the FACP should the main control valve be closed. Monitoring of the main sprinkler control valve is important because a closure of the main control valve would disrupt water flow into the fire sprinkler system and render the system ineffective.

Figure 6.4: Fire Sprinkler Water Flow Switch

Figure 6.5: Fire Sprinkler Tamper Switch

The water flow and tamper switch, along with the alarm initiating switch installed on the Ansul kitchen fire suppression system, will connect to the fire alarm system via monitor modules. These modules allow for devices having electrical contacts to be given a unique function, including a device address, within the fire alarm system. The goal is to allow the fire sprinkler and kitchen fire suppression systems to function independently of the fire alarm system, but relay relevant events to the fire alarm system. The monitor module to be used is a Notifier FMM-1 shown in Figure 6.6 below.

Figure 6.6: FMM-1 Monitor Module

Manual pull stations shall consist of addressable Notifier pull stations model NGB 12 LX shown in Figure 6.7 below.

Figure 6.7: NGB-12LX Pull Station

Location, Spacing, and Placement of Fire Alarm Initiation Devices

Smoke detector placement meets the minimum requirements found in NFPA 72 and the IBC. As discussed above smoke detectors have been located in the two electrical rooms: 522 and 507 where fire alarm equipment is located. This includes the FACP, fire alarm terminal cabinet (FATC), and the notification appliance circuit extenders in accordance with NFPA72 10.4.4 and the IBC Section 907.4.1. The location of smoke detectors was shown above in Figure 6.2.

Manual pull stations are installed throughout the building to meet the minimum requirements set forth in IBC Section 907.4.2. Section 907.4.2 mandates pull stations be spaced so that walking distance to the nearest pull station is 200ft or less, and that pull stations be located within 5ft from the entrance to each exit. The result is that not every room contains a manual pull station. Pull stations must also be mounted so that the activating lever is between 42" and 48" from the floor assembly. Figure 6.8 shows the location of manual pull stations in the Student Center.

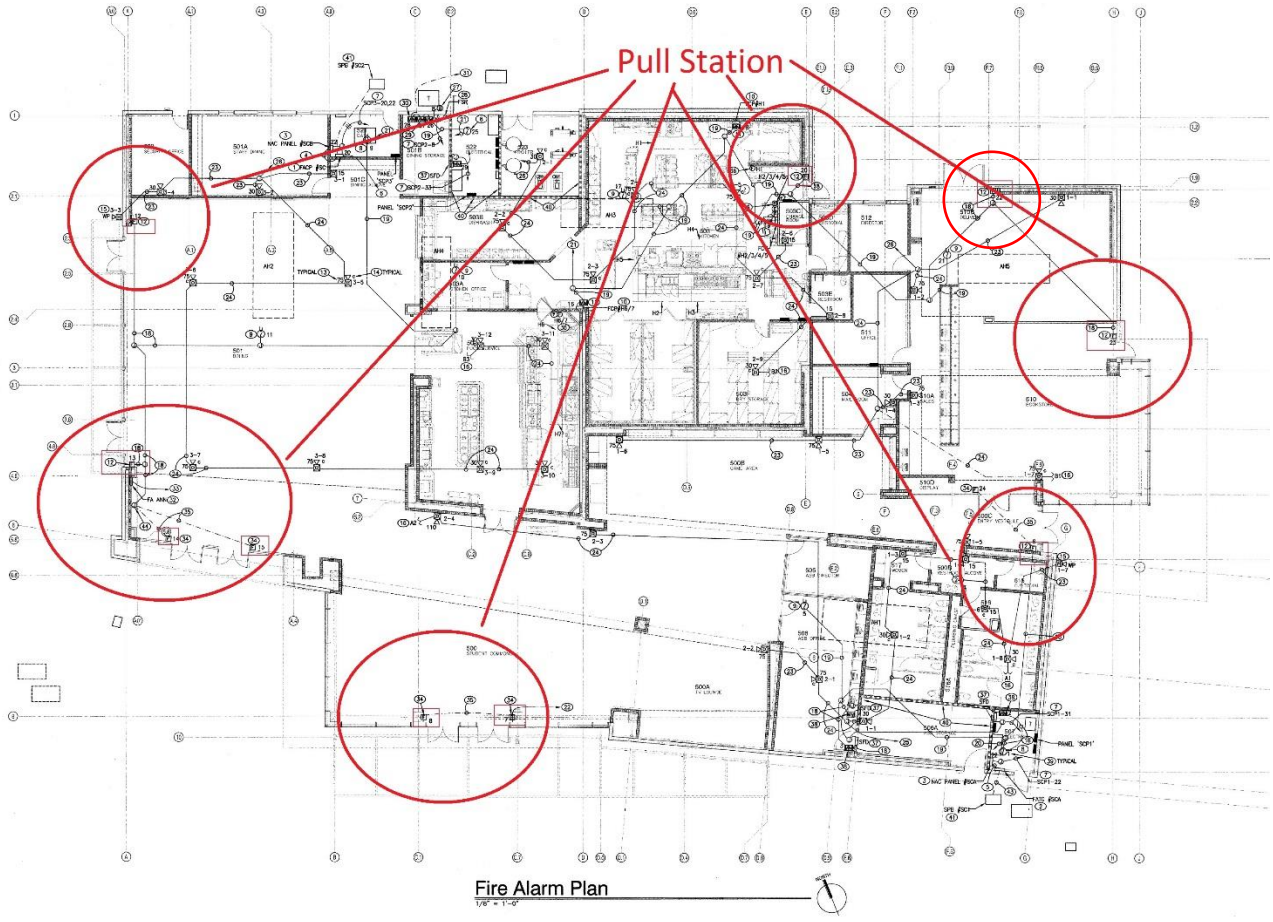

Figure 6.8: Pull Station Layout

Smoke Control

Smoke control system provisions in IBC Chapter 9 do not apply to the Student Center because this facility does not meet the thresholds that require the use of smoke control systems. Nonetheless, there exists a means of smoke control via the fire alarm system. Duct smoke detectors are required based on the provisions of IMC Section 606. Section 606.2.1 requires duct detectors as a result of the return air capacity in some areas of the Student Center exceeding 2000 cfm.

Operational requirements of duct smoke detections are specified in subsequent sections of the IMC. Section I606.3 requires that duct detectors be installed to comply with NFPA 72. IMC Section 606.4 requires that the air distribution system shut down upon activation of duct smoke detectors and that the duct detectors must be connected to the fire alarm system.

The function of the duct smoke detectors is to prevent the spread of combustion products from an area involved in fire to the remainder of the building. Locations of duct smoke detectors at the Student Center are outlined in Figure 6.9 below.

Fire Alarm Notification Devices

Notification of occupants to fire emergencies should be distinct and clearly recognizable in order to be most effective. The discussion with regards to fire alarm signal types above lays a groundwork for understanding how code requirements address this goal.

Notification appliances are generally non-intelligent, meaning that such devices are not monitored or controlled individually by the fire alarm system. Traditional wiring is used to create electrical circuits containing a set amount of notification appliances. When a malfunction, such as a short circuit, occurs the entire circuit must be evaluated since the FACP does not provide for which device the condition starts (or ends) at. These circuits are also termed “non-power limited”. In contrast, the circuits for initiation devices and other addressable devices will be power limited. Therefore, there is a need to separate the non-power limited and power limited wiring of the fire alarm system, which results in separate conduits for initiation and notification conduction media in most cases.

Devices used for notification of occupants in the Student Center include the System Sensor P2R wall-mount horn/strobe, PC2R ceiling-mount horn/strobe, and SR strobe.

Location, Spacing, and Placement of Fire Alarm Notification Devices

Chapter 18 of NFPA 72 provides the requirements applicable to the location, spacing, and placement of notification appliances. The traits relevant to device spacing include: (1) light intensity to satisfy NFPA 72 18.5.4.4, 18.4.5.3.1(a), figure 18.4.5.3.1, and 18.5.4.3.1(a); (2) audibility output in decibels to satisfy NFPA 18.4.3 in conjunction with the decibel loss rule given in 18.4.3. Unfortunately, the device layout on the project plans does not identify the decibel and/or candela ratings. However, the rated capacities for the P2R, PC2R, and SR devices are more than capable of meeting the spacing requirements given the proper settings. Ultimately the fire alarm

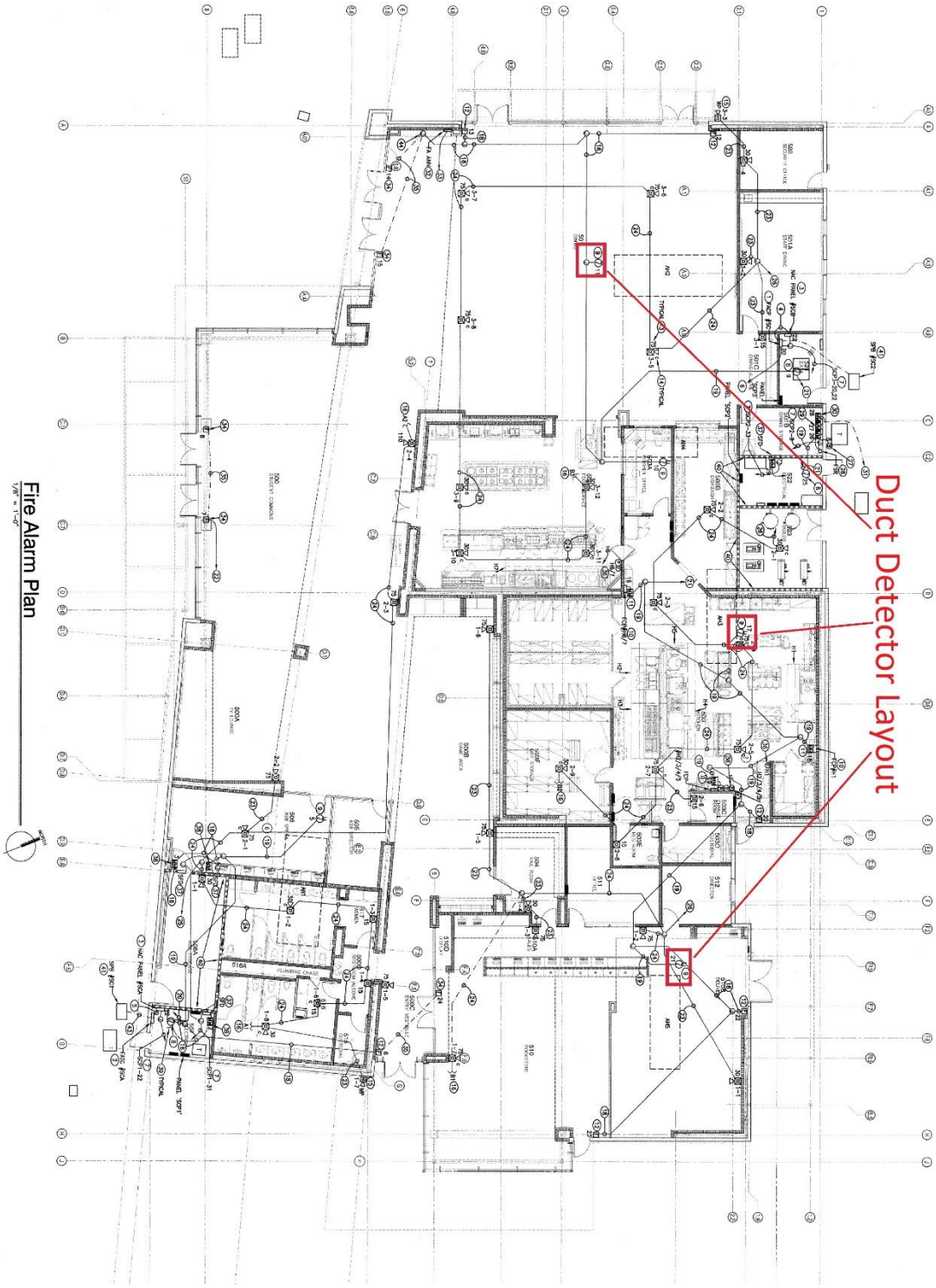

Figure 6.9: Duct Detector Layout

design must incorporate these settings, and it is preferable to be accomplished prior to providing these documents to the installing contractor.

Mounting of the strobes and combination horn/strobe devices must meet the requirements of 18.5. Given ceiling heights of 14’ or more this should be accomplished. There is one device located outside, and it is protected to agree with 18.3.3.1 because a listed weather resistant back box is to be provided.

Figure 6.10 below provides the fire alarm system layout and identification of notification appliance locations.

Mass Notification System

A public announcement (PA) system is provided in the student center as part of the campus PA system. There are no indications on the plans showing shared equipment between the fire alarm system and the PA system. Therefore, the PA system cannot interrupt the fire alarm system signal directly. There is the possibility to allow the PA system to serve as an emergency alarm communication system as introduced in NFPA 72 10.7.1, which would require a risk analysis based on many factors described in 10.7.1, 25.1.8, and 24.5.7. Overall, the goal would be development of a consensus on the conditions that warrant interruption of fire alarm signals along with a standard set of procedures for doing so.

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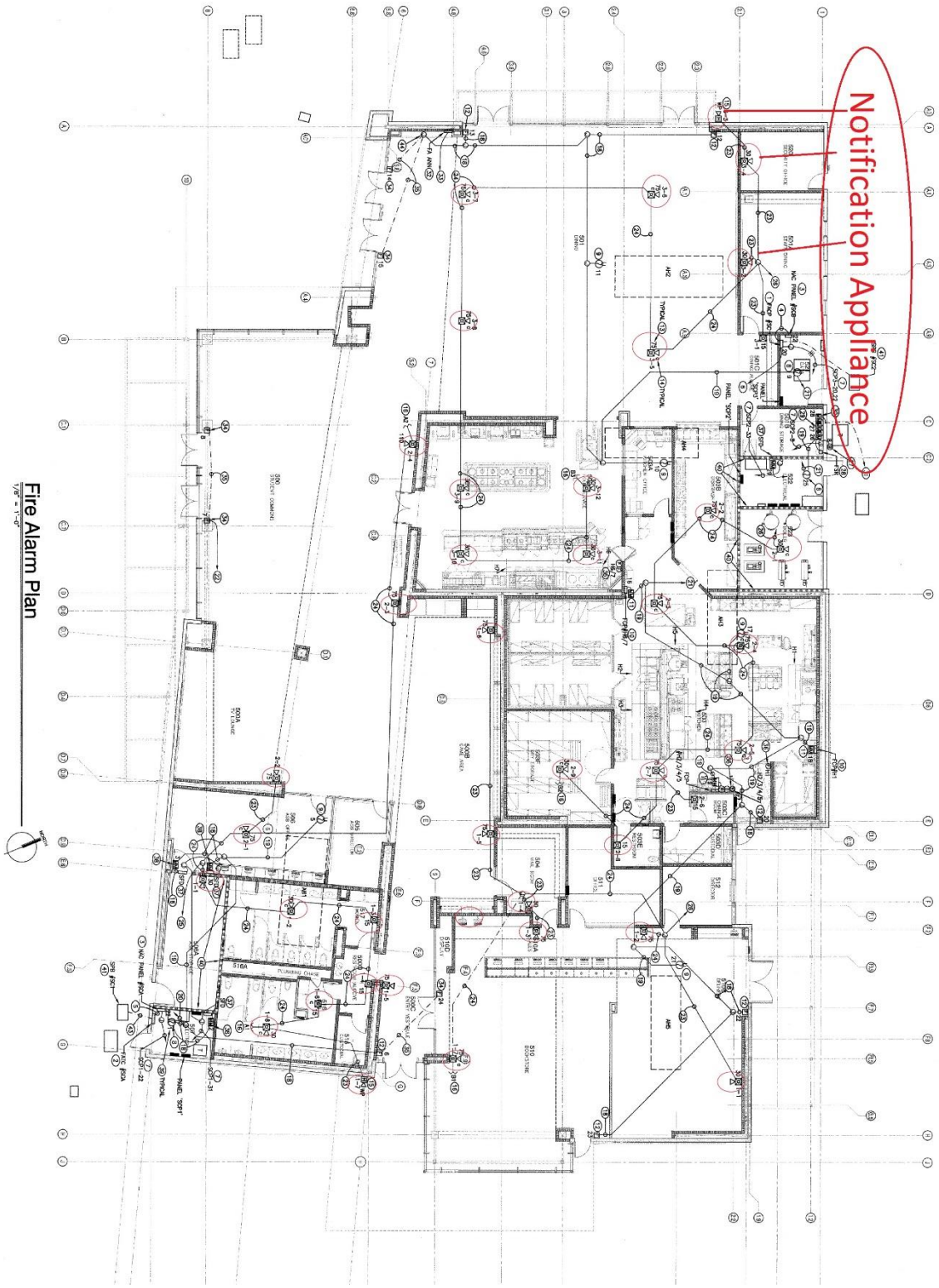

Figure 6.10: Notificatoin Appliance Layout

Power Requirements

Requirements for secondary power sources serving protected premises fire alarm systems fall under NFPA 72 10.6.7.3. In this project it was decided to use battery power as the secondary source. Section 10.6.7.2 requires the batteries to sustain system operation in the normal state for 24 hours followed by 5 minutes of continuous operation of all notification appliances. Section 10.6.7 identifies a 20% margin of safety for battery calculations.

For this project there are three devices that are responsible for powering the fire alarm system components: the FACP, and two remote power supplies. The remote power supplies are Notifier FCPS-24S8. They are dedicated to running the notification applicant circuits (NAC) for the fire alarm system. The fire alarm design plans correctly handle the battery calculations given the stated appliance settings for the power supplies. However, the settings for the NAC devices need to be accurately demarcated on the drawings. The calculations are provided in Table 6.1 and Table 6.2 below.

Table 6.1: Battery Calculations for NAC Extender Panel

NAC PANEL #SCA (NOTIFIER #FCPS-24S8)		STANDBY CURRENT AMPS		ALARM CURRENT AMPS	
	QUAN	EACH	SUBTOTAL	EACH	SUBTOTAL
NAC PANEL (FCPS #24S8)	1	0.080	0.080	0.240	0.240
HORNS	1			0.075	0.075
HORN/STROBE 15CD	0			0.079	0.000
HORN/STROBE 30CD	3			0.107	0.321
HORN/STROBE 75CD	3			0.176	0.528
HORN/STROBE 110CD	1			0.212	0.212
STROBE 15CD	3			0.071	0.213
STROBE 30CD	0			0.096	0.000
STROBE 75CD	0			0.153	0.000
STROBE 110CD	0			0.195	0.000
STROBE 135CD	0			0.207	0.000
SUBTOTAL			0.080		1.589
STANDBY CURRENT X 24HRS			1.920		
ALARM CURRENT X 5 MINUTES			0.133		
TOTAL BATTERY AH REQUIRED			2.053		
STANDBY BATTERY (AMP-HR)			7.0		

Table 6.2: Battery Calculations for NAC Extender Panel

NAC PANEL #SCB (NOTIFIER #FCPS-24S8)		STANDBY CURRENT AMPS		ALARM CURRENT AMPS	
	QUAN	EACH	SUBTOTAL	EACH	SUBTOTAL
NAC PANEL (FCPS #24S8)	1	0.080	0.080	0.240	0.240
HORNS	1			0.075	0.075
HORN/STROBE 15CD	0			0.079	0.000
HORN/STROBE 30CD	10			0.107	1.070
HORN/STROBE 75CD	14			0.176	2.464
HORN/STROBE 110CD	0			0.212	0.000
STROBE 15CD	3			0.071	0.213
STROBE 30CD	0			0.096	0.000
STROBE 75CD	0			0.153	0.000
STROBE 110CD	0			0.195	0.000
STROBE 135CD	0			0.207	0.000
SUBTOTAL			0.080		4.062
STANDBY CURRENT X 24HRS			1.920		
ALARM CURRENT X 5 MINUTES			0.338		
TOTAL BATTERY AH REQUIRED			2.259		
STANDBY BATTERY (AMP-HR)			7.0		

Calculations for the FACP appear slightly incorrect per the drawings provided. These calculations have been redone and are shown in Table 6.3 below. The reason for the difference is due to selection of current draws for the appliances. However, the updated calculations do not differ materially from what is provided on the fire alarm plan sheets.

All three sets of batteries are capable secondary power supplies and exceed the requirements.

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Table 6.3: Battery Calculations for the FACP

ATTERY CALCULATIONS											
FIRE ALARM CONTROL PANEL MODEL NFS2-640											
STANDBY LOAD											
								CURRENT			TOTAL
MODEL #			DESCRIPTION			QTY		EACH (AMPS)			CURRENT
CPU2-640E			FACP CIRCUIT BOARD			1	X	0.25000	AMPS	=	0.2500
			FACP POWER PER NAC			3	X	0.03500	AMPS	=	0.1050
KDM-R2			PRIMARY DISPLAY/KEYBOA			1	X	0.10000	AMPS	=	0.1000
NCM-F			NETWORK CONTROL MODU			1	X	0.11000	AMPS	=	0.1100
LCD-80TM			REMOTE ANNUNCIATOR PA			1	X	0.10000	AMPS	=	0.1000
FMM-101			MONITOR MODULE			8	X	0.00040	AMPS	=	0.0032
NGB-12 LX			MANUAL PULL STATION			10	X	0.00038	AMPS	=	0.0038
FSP-851			SMOKE DETECTOR - PHOTO			2	X	0.00030	AMPS	=	0.0006
DNR			DUCT DETECTOR W/RELAY			5	X	0.02600	AMPS	=	0.1300
								TOTAL STANDBY LOAD	AMPS	=	0.4476
ALARM LOAD											
								CURRENT			TOTAL
MODEL #			DESCRIPTION			QTY		EACH (AMPS)			CURRENT
CPU2-640E			FACP CIRCUIT BOARD			1	X	0.25000	AMPS	=	0.2500
			FACP POWER PER NAC			3	X	0.03500	AMPS	=	0.1050
KDM-R2			PRIMARY DISPLAY/KEYBOA			1	X	0.10000	AMPS	=	0.1000
NCM-F			NETWORK CONTROL MODU			1	X	0.11000	AMPS	=	0.1100
LCD-80TM			REMOTE ANNUNCIATOR PA			1	X	0.10000	AMPS	=	0.1000
FMM-101			MONITOR MODULE			8	X	0.00040	AMPS	=	0.0032
NGB-12 LX			MANUAL PULL STATION			10	X	0.00500	AMPS	=	0.0500
FSP-851			SMOKE DETECTOR - PHOTO			2	X	0.00650	AMPS	=	0.0130
DNR			DUCT DETECTOR W/RELAY			5	X	0.09700	AMPS	=	0.4850
								TOTAL ALARM LOAD	AMPS	=	1.2162
PROVIDE 24 HOUR OF STANDBY PLUS 5 MINUTES OF ALARM											
0.4476	AMPS	X	24.00	HOURS			=	10.7424	AMPHOURS		
1.2162	AMPS	X	0.0840	HOURS			=	0.1022	AMPHOURS		
			TOTAL AMPHOURS				=	10.8446	AMPHOURS		
			DERATE FACTOR				X	1.2			
			REQUIRED AMPHOURS				=	13.0136	AMPHOURS		
SUPPLY TWO BATTERIES, POWER SONIC PART # PS-12180, 12 VOLTS, 18 AMPHOURS*											
**18 AH BATTERIES ARE CHOSEN BECAUSE THAT IS THE MINIMUM BATTERY SIZE*											
ALLOWED FOR THE NOTIFIER NFS2-640 PER THE SPECIFICATION SHEET											

Voltage drop calculations are also required per NFPA 70 Section 7.4.10. Guidance for acceptable voltage drops is gained by considering the installation manuals for the NFS2-640 fire alarm control unit and the FCPS-24S8 remote power supply. The former limits voltage drops to 2 VDC, while the former recommends a maximum 10% voltage drop. Table 6.4 below is an example of the voltage drop calculations performed. Based on these calculations, the voltage drop for the fire alarm control panel and the two remote power supplies do not exceed recommended values.

Table 6.4: Voltage Drop Calculations

FIRE ALARM SYSTEM VOLTAGE DROP CALCULATION:

NAC #SCA-1

	QUAN.	ALARM CURRENT AMPS EACH	SUBTOTAL
HORNS	1	0.075	0.075
HORN/STROBE 15CD	0	0.079	0.000
HORN/STROBE 30CD	3	0.107	0.321
HORN/STROBE 75CD	1	0.176	0.176
HORN/STROBE 110CD	0	0.212	0.000
STROBE 15CD	3	0.071	0.213
STROBE 30CD	0	0.096	0.000
STROBE 75CD	0	0.153	0.000
STROBE 110CD	0	0.195	0.000
SUBTOTAL			0.785
RESISTANCE FOR #12 AWG PER 1000-FT			2.010
DISTANCE OF LAST DEVICE FROM PANEL			160
VD = (LOAD X 2.01 X 2 X DISTANCE)/1000			0.505
VD PERCENTAGE AT 24V			2.104

NAC #SCA-2

Fire Alarm System Commissioning, Inspection, Testing, and Maintenance

NFPA section 10.5 sets forth these requirements for having qualified persons perform inspection, testing, and maintenance of fire alarm systems. In calling for “persons who are experienced in the proper design, application, installation, and testing of the systems” this section stresses the need for consulting applicable laws and procedures set forth in the relevant jurisdiction. For example, some states require that system designers be licensed engineers.

Chapter 14 of NFPA 72 contains the requirements for fire alarm system commissioning, testing, inspection, and maintenance. NFPA 72 Table 14.3 gives detailed information concerning when the various fire alarm system components are to be inspected. Table 14.4.2.2 provides testing requirements. Generally, the owner of a building equipped with a fire alarm system will need to have a licensed fire alarm contractor perform annual and semi-annual inspection and testing of the fire alarm system. However, the relevant codes sections should be reviewed, and administrative controls put in place to satisfy the more frequent requirements, which can sometimes require weekly attention.

Maintenance of fire alarm system components is mostly deferred to the recommendations of the fire alarm system manufacturer in NFPA 72 Section 14.5. The important thing to recognize here is that manufacturers of fire alarm systems provide listings showing what devices are compatible for use with their product. The fire alarm components used the Student Center are listed as being compatible with one another. The exception concerns the fire alarm switch for the Ansul kitchen system, the fire sprinkler tamper switch, and the fire sprinkler flow switch, none of which are considered fire alarm system components proper. The owner should set forth administrative controls to ensure that contractors performing work on the fire alarm system during initial installation or afterwards verify that any components added to the system as new or as replacements should be listed for use with the original system components.

Summary

Smoke detectors are not the primary means of automatic fire detection, but photoelectric type smoke detectors are planned for locations involving sensitive fire alarm equipment. Fire sprinklers are the primary means of detection as these devices are located throughout the Student Center. The integration of the fire sprinklers in to the fire alarm system is via a water flow switch installed on the sprinkler system riser which is connected to a monitor module installed on the fire alarm system. There is a similar connection between the fire alarm system and the kitchen fire suppression system. Duct smoke detectors are installed as a means of smoke control and are intended to limit the spread of combustion products via the HVAC system. Duct smoke detectors are connected to the fire alarm system.

Notification appliances are installed in the correct orientation and with the correct spacing throughout the Student Center. Power requirements for the fire alarm control panel and the two notification appliance circuit extender panels, with regards to a secondary power source, are satisfied by batteries, which calculations show are properly sized. Similarly, the voltage drop of these three devices when servicing all connected devices does not exceed acceptable limits.

Having shown that the fire alarm system is capable of alerting building occupants to fire emergencies now requires an examination of how the Student Center is designed to accommodate the reaction of occupants to such notification. This involves analysis of the planned egress system and egress system components, which is provided for in the next section.

Taft Community College - New Student Center

Fire and Life Safety Analysis

Section 7: Egress System and Components

Egress System and Components

Buildings need to be designed so that the occupants and egress system components work in harmony, which can be satisfied by ensuring that the egress components are clearly identifiable, are accessible, and are adequately designed to allow for movement of occupants. This section will consider the prescriptive code requirements designed to meet these three requirements with respect to the Student Center.

Occupant Load Analysis

Ensuring that the built environment is able to accommodate the movement of persons during emergency situations begins with a benchmark of the number of persons expected to occupy this environment at any given time. Contemporary prescriptive requirements, as set forth in Chapter 10 of the IBC, define a maximum number of persons allowed to use a building as the occupant load. IBC Section 1004.1.2 and Table 1004.1.2 provide the means for determining the occupant load for each area within a building. A function is assigned to each area based on the expected use of that area. Each function defined in Table 1004.1.2 has an occupant load factor that is applied to the area in question as shown by the relation below to obtain the occupant load.

$$Occupant\ Load = \frac{Area\ of\ space\ considered}{Occupant\ load\ factor\ based\ on\ function\ of\ space}$$

An example of this is shown on Figure 7.1, and a summary of the occupant load for each area of the Student Center is provided in Table 7.1.

Figure 3.1

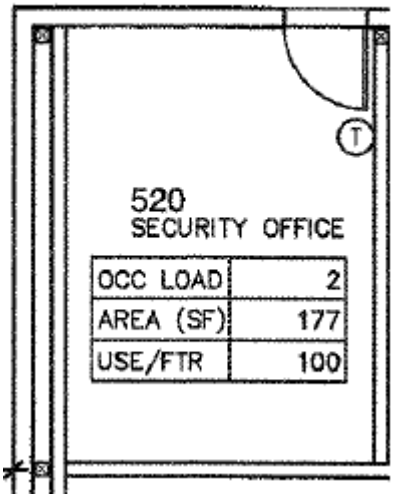

Figure 7.1: Example of Occupant Load Information

On Project Plans

Table 7.1: Occupant Load Breakdown by Area

[illegible]: Occupant Load Summary					
ROOM #	NAME	AREA (SQ. FT.)		OCCUPANT LOAD FACTOR PER IBC TABLE 1004.1.2	OCCUPANT LOAD
500	STUDENT COMMONS	2802	*	15	187
500A	TV LOUNGE	510	*	15	34
500B	GAME AREA	1084	*	15	73
500C	ENTRY VESTIBULE	330		0	0
500D	RESTROOM ALCOVE	84		0	0
501	DINING	3695	*	15	247
501A	STAFF DINING	385	*	15	26
501B	DINING STORAGE	142		300	1
502	FOOD SERVICE	718	*	5	144
503	KITCHEN	2175		200	11
503A	KITCHEN OFFICE	143		100	2
503B	DISHWASH	348		200	2
503C	CHANGE ROOM	46		0	0
503D	CUSTODIAL	94		0	0
503E	RESTROOM	63		0	0
503F	DRY STORAGE	410		300	2
504	MAIL ROOM	217		300	1
505	ASB DIRECTOR	169		100	2
506	ASB OFFICE	482		100	5
506A	ASB STORAGE	300		300	1
507	ELECTRICAL	103		300	1
510	BOOKSTORE	1282		60	22
510A	SALES	306		100	4
510B	DELIVERY	835		300	3
511	OFFICE	266		100	3
512	DIRECTOR	157		100	2
515	CUSTODIAL	60		0	0
516	MEN'S RESTROOM	333		0	0
517	WOMEN'S RESTROOM	388		0	0
520	SECURITY OFFICE	177		100	2
521	DATA	112		300	1
522	ELECTRICAL	143		300	1
523	BOILER	240		300	1
TOTAL					778
*INDICATES NET SQUARE FOOTAGE.					

An exit analysis floor plan showing the location of each area and the respective occupant loads is found in Figure 7.2.

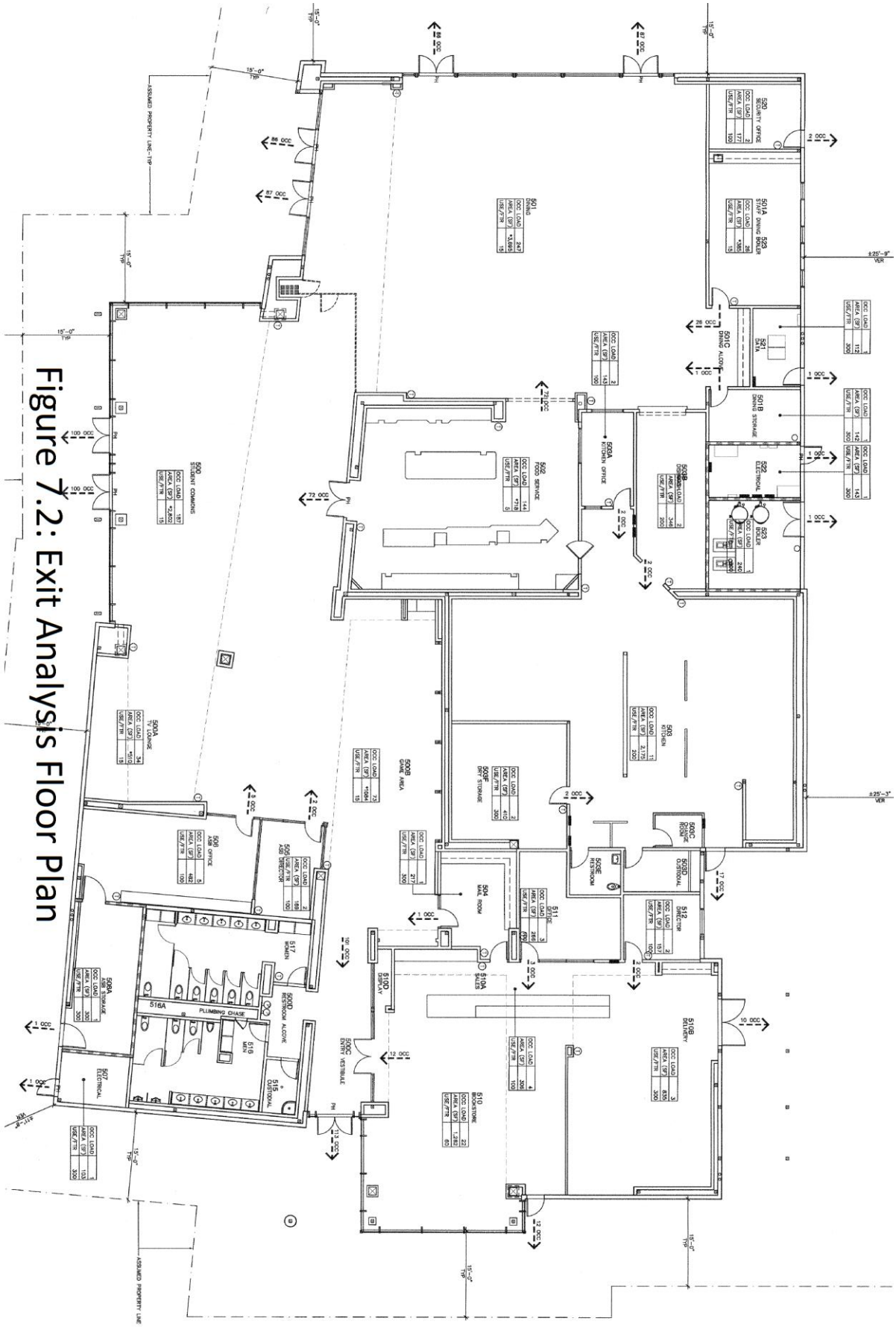

Figure 7.2: Exit Analysis Floor Plan

Egress Component Capacity

Sizing of egress components shall accommodate the occupant load of the space(s) served in accordance with IBC Section 1005.3. Exits in the Student Center consist of doorways and corridors. Determining the capacity of exits complies with IBC Section 1005.2 and 1005.3.2, where the latter section provides that the capacity of these components are to be determined by the following relation:

$$Capacity\ (Occupant\ Load) = \frac{Component\ Width\ (in.)}{0.2\ \frac{in.}{Occupant}}$$

Doors

The door schedule provided shows that doors serving as entry/exit doors to the building are to be at least 32 in. wide, and that the doors used in the interior of the building are to also be 32" wide. Figures 7.3 and 7.4 show a snapshot of the door schedule on the project drawings.

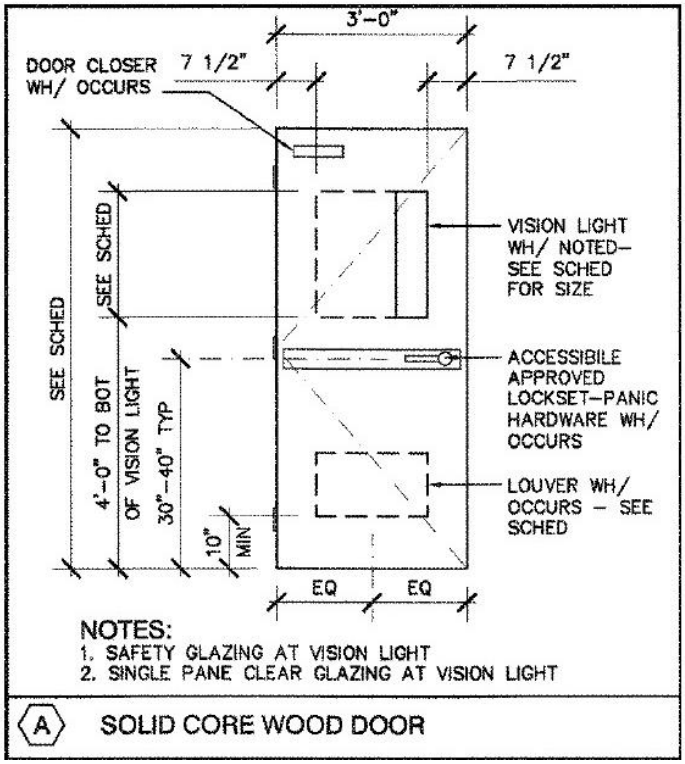

Figure 7.3: Door Detail

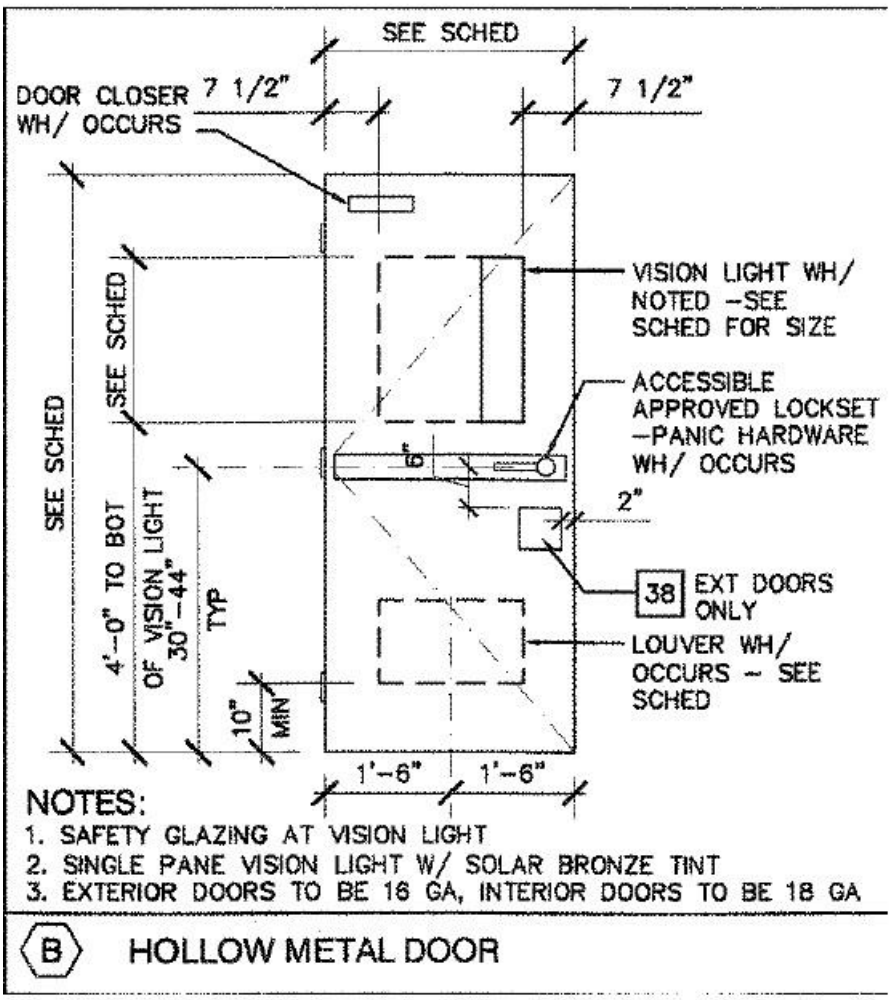

Figure 7.4: Door Detail

The result is that one can expect each door to provide a capacity of 180 occupants. A 36" door width satisfies the requirements of IBC Section 1010.1.1, which requires a minimum 32" clear width.

Corridors

There is one true corridor in the Student Center, and it serves as a connection point between the East entry vestibule, the bookstore, restrooms, and the game area. Figure 7.5 shows this location and indicates that the corridor width at the narrow point is approximately 80", which results in a capacity of 400 occupants for the corridor. A 400 occupant capacity exceeds the 113 occupants that are expected to pass through this corridor when using the East exit.

IBC Section 1020.2 and Table 1020.2 are satisfied with respect to the corridor width. It is also worth noting that IBC Section 1020.1 and Table 1020.1 do not require fire resistance ratings for the corridors.

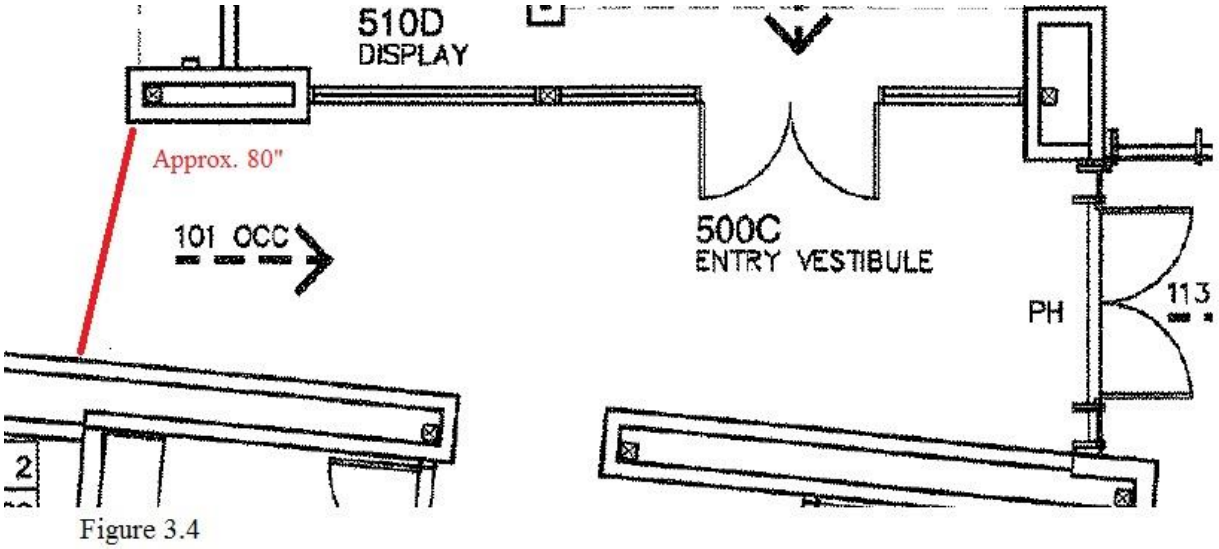

Figure 7.5: Minimum Corridor Width

At this point, the capacity of egress paths for the Student Center have been considered. Such paths consist of doorways and a single corridor. All these paths are adequate for the designed occupant load that is to be served under full usage.

Egress Component Accessibility

Door hardware includes a latch, lock, and door closer. The location of such hardware shall be installed between 34” and 48” above the finished floor to satisfy hardware height requirements in IBC Section 1010.1.9.2 and to satisfy a lower limit of 34” per Section 10.10.1.1.1. This section restricts the hardware from extending more than 4” into the doorway. The door closer must be located at least 78” above the finished floor if it will extend more than 4” into the doorway.

There are restrictions with regards to the force required to operate door latches, to set the door in motion, to push/pull the door between open/closed positions, and to have the door swing to a full open position: 15-pound, 30-pound, 5-pound, and 15-pound forces respectively. IBC Section 1010.1.3 defines these requirements.

Locks installed on doors may consist of panic hardware or fire exit hardware. Since the Student Center is designed as a Group A-2 occupancy, this requirement applies per IBC Section 1010.1.10. The goal is to prevent doors being unusable during emergency events, which could happen since visitors to the Student Center would not have keys to open locked doors. Moreover, locked doors would delay egress times. Provisions for panic hardware installation are provided in IBC Section 1010.1.10.1 which requires installation and listing per UL 305 or UL 10C for panic or fire exit hardware.

There is an allowance for electromagnetic locking mechanisms for egress doors in Group A occupancies. Design plans indicate the use of electromagnetic door closers/locks. In this case, IBC

Section 10.10.1.9.9 requires that such hardware be designed so that the electromagnetic lock is released when the panic or exit hardware is operated.

All doors must swing in the direction of egress travel per IBC Section 10.10.1.2.1 when the areas served by such doors have an occupant load of 50 or more persons. The exit analysis floor plan shown on Figure 7.2 shows that doors are designed to comply with this provision.

Consideration is now given to the minimum number of exits required and the maximum travel distance to such exits. IBC Section 1006.2.1 and Table 1006.2.1, shown in Table 7.2 below, provides that each space within the Student Center shall have at least two exits and have a maximum travel distance to an exit of 75 feet when the occupant load of that space exceeds 49. Group A occupancy classification and the use of a sprinkler system provide the selection criteria within Table 7.2. The travel distance discussed above must be applied to the game area (occupant load of 73), the food service area (occupant load of 144), the student commons (occupant load of 167), and the dining area (occupant load of 247).

Table 7.2: IBC Table 1006.2.1

TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Sprinkler System (feet)		With Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]

The minimum number of exits for the entire Student Center is three based on IBC Section 1006.3.1 and Table 1006.3.1, shown in Table 7.3 below.

Table 7.3: IBC Table 1006.3.1

TABLE 1006.3.1
MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
More than 1,000	4

Doors serving each space in the Student Center are arranged so that the distance between them complies with IBC Section 1007.1.1 and 1007.1.2. These requirements are meant to ensure that doors are not spaced too close or too far from one another.

Figure 7.6 shows the maximum possible distance from an occupied area to an exit within the Student Center. This travel distance is from the ASB Office to the exit door located in the Student Commons.

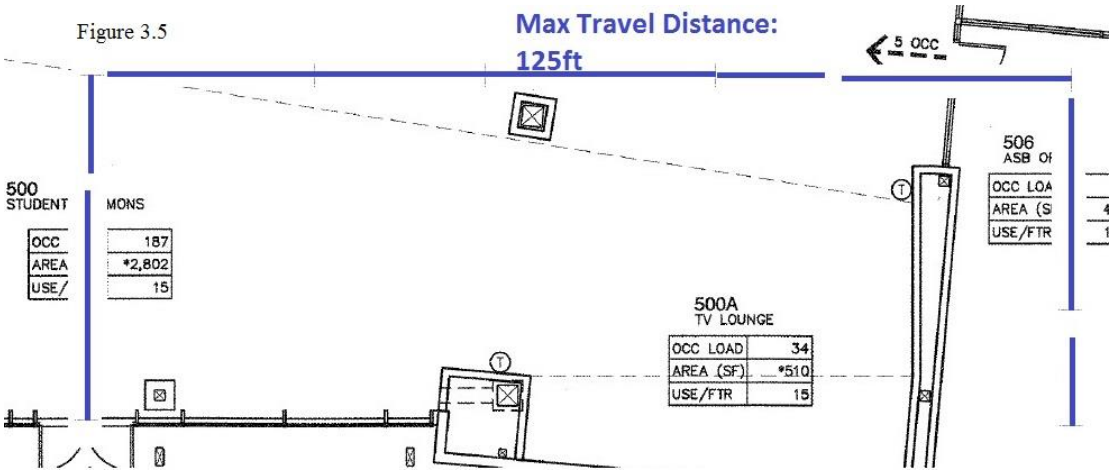

Figure 7.6: Student Center Max Travel Distance

The maximum travel distance is approximately 125 feet. A 125 ft. travel distance complies with IBC Section 1017.2 and Table 1017.2, shown in Table 7.4 below, where the travel distance is limited to 250 ft.

Table 7.4: IBC Table 1006.2.1

TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250[b]
I-1	Not Permitted	250[b]
B	200	300[c]
F-2, S-2, U	300	400[c]
H-1	Not Permitted	75[d]
H-2	Not Permitted	100[d]
H-3	Not Permitted	150[d]
H-4	Not Permitted	175[d]
H-5	Not Permitted	200[c]
I-2, I-3, I-4	Not Permitted	200[c]

Visibility of Egress Components

Lighting requirements are found in IBC Section 1008. There are requirements for the walking surface illumination under both normal and emergency power conditions. Exit signs should be installed to provide the necessary illumination in case the building power fails. Exit signs must also to be visible during normal lighting conditions. IBC Section 1013.1 requires installation of exit signs to indicate exits and exit access doors. Section 1013 has further requirements for exit signs including the size of characters and the words that may be used on such signs. It should be verified that the contractor installing these signs complies with these provisions.

Summary

Thus far it has been established that the Student Center meets the prescriptive requirements with regards to egress systems. It should be evident at this point in the project that multiple building systems are required to function together in providing for occupant safety. The next step is to consider the egress of occupants from the building, along with the time available for such egress. This will be accomplished by using accepted methods for performance based design.

Taft Community College

New Student Center Fire and Life Safety Analysis

Section 8: Performance Based Design

Performance Based Design

Uncertainty marks the largest obstacle for fire protection engineering. Every level of a built environment can change: from structural framing exposed to corrosion, an increase in persons beyond the designed occupant load, to temporary storage of safety cones, or a faulty HVAC thermostat. All such changes can have a meaningful impact on the results of a fire event.

A second challenge is that the best tools available to fire protection engineers involve empirical models. Given the numerous possible configurations that even a single room can have, one can quickly understand that no amount of empirical data sets would cover all possible building designs, let alone deviations from such designs.

Despite these limitations, fire protection engineers can use judgment to design for fire scenarios. Such scenarios can be used to set boundaries on what can reasonably be expected from fire events, and make informed recommendations to improve life safety.

Goals and Expectations

The performance based design will be used to investigate the adequacy of prescriptive code requirements, as addressed earlier in this report, with regards to particular fire scenarios and performance criteria. No abnormal construction or design selections at the Student Center require a performance based design as a result of exceeding the bounds of prescriptive code requirements.

Multiple performance criteria will be considered.

Occupants shall not be exposed to “instantaneous or cumulative” untenable conditions per LSC Section 5.2.2.

At least one occupant shall be located at the most remote point from exits per LSC Appendix A5.4.5.3.

Performance Based Design Criteria

Recent fire incidents, such as the World Trade Center attack, have resulted in increased focus on the safety of occupants when designing fire and life safety systems. Occupant safety is a critical requirement in all design scenarios, and it is the primary consideration with regards to the Student Center. However, it is also important that fire protection engineers consider the integrity of the building even after occupants have been evacuated. Both considerations: occupant safety and structural integrity have been addressed.

Occupant safety has been addressed by considering the following tenability criteria:

1. Visibility.
    a. One measure of visibility conditions is that visibility shall be considered tenable so long as the visibility distance is not reduced below 10m within the means of egress.

In an evacuation study, *Fire Research Note 953*, author P.G. Wood provides evidence that nearly all occupants were able to continue in their chosen direction when visibility levels were above 10m. A 10m visibility limit is also reasonable since the longest egress component at the Student Center, the East Vestibule, is approximately 10m long.

   b. A second measure of visibility conditions is that the smoke layer height shall not descend below 6 ft. This limit is in agreement with the recommendation in LSC Appendix A5.2.2 Method 2.

2. Exposure to carbon monoxide
   a. SFPE Handbook Table 63.9 provides that at approximately 35,000ppm-min, a human will be incapacitated from exposure to carbon monoxide. A worst case scenario would be to consider the highest CO concentration that occupants can be continuously exposed to during a ten minute evacuation time. The corresponding CO concentration is 3.5×10^3 ppm, which will be the tenability threshold for CO exposure.
   b. Tenability evaluation based on CO concentration is in agreement with the recommendation in LSC Appendix A5.2.2 Method 1.
3. Exposure to temperature effects.
   a. SFPE Handbook Chapter 63 provides results of previous studies on temperature effects which showed that at 60 °C (140 °F) the air becomes unbreathable. Therefore, once the temperature of the exit path at a height of 1.8m (6ft) exceeds 60 °C, the exit is no longer considered tenable.

The goal is to ensure that Student Center occupants are able to leave the building during a fire event prior to the fire event creating untenable exposures with regards to the criteria above. NFPA Handbook Chapter 4, and the LSC Appendix A.4.8.2.1(3), provide a means for making this determination by detailing the need for the available safe egress time (ASET) to exceed the required safe egress time (RSET).

Structural integrity has been addressed by considering the following tenability criteria:

1. Onset of flashover conditions.
   a. Flashover criteria is taken from the SFPE Handbook Chapter 38 (Pg. 1273). Flashover can be considered to occur when either the hot gas layer under the ceiling reaches a temperature of 500 °C (932 °F), or when the heat flux at the floor reaches 20 kW/m^2.

A complete structural analysis to fire exposure is beyond the scope of this project. However, limiting a potential fire so that it does not spread beyond the area of origin is a first step to ensuring that the structure is not continuously exposed to fire, which in turn helps to ensure that structural integrity is not compromised by fire events.

Fire Model Scenario Selection

To guide the selection of an appropriate fire scenario, Chapter 5 of the LSC was consulted. From the eight design fire scenarios provided, two stood out as the most reasonable for the task. Excerpts from the LSC detailing these two scenarios are provided in Figures 8.1 and 8.2 below.

5.5.3.1* Design Fire Scenario 1. Design Fire Scenario 1 shall be described as follows:

(1) It is an occupancy-specific fire representative of a typical fire for the occupancy.
(2) It explicitly accounts for the following:
  (a) Occupant activities
  (b) Number and location of occupants
  (c) Room size
  (d) Contents and furnishings
  (e) Fuel properties and ignition sources
  (f) Ventilation conditions
  (g) Identification of the first item ignited and its location

Figure 8.1: Excerpt from LSC Section 5.5.3.1

5.5.3.6* Design Fire Scenario 6. Design Fire Scenario 6 shall be described as follows:

(1) It is the most severe fire resulting from the largest possible fuel load characteristic of the normal operation of the building.
(2) It addresses the concern regarding a rapidly developing fire with occupants present.

Figure 8.2: Excerpt from LSC Section 5.5.3.6

Scenario 1 was modeled because it represents a scenario that should be common to the occupancy considered. Selection of a fire event was guided by information from NFPA Handbook Section 3. In particular, data for confined fires presented in NFPA Handbook Table 3.4.11 showed that, with regards to structure fires, the largest percentage of confined fires reported involved trash/rubbish. Therefore, it seems reasonable to consider a fire involving trash/rubbish within a compartment of the Student Center. A likely place for trash to exist is within an office environment. The model for design fire scenario 1 will involve a paper product trash fire located in the ASB Office (Room 505), based on the evidence and reasoning provided above. This fire scenario will be referred to as Design Fire A.

Scenario 6 was also modeled. This model was based on a fire occurring in the Bookstore and involving substantial amounts of books/paper products. The scenario was chosen to provide a worst-case fire exposure and evaluate the adequacy of the fire and life safety systems. A fire in the Bookstore has the potential to threaten occupants using a major exit, the East Vestibule. It is also possible to imagine a scenario where ignition of the fire event occurs after operating hours when the Bookstore is not occupied. Therefore, occupant notification will depend on the fire systems

present. These three things: large fuel load, potential for the fire to affect areas beyond the area of origin, and the potential for the fire to develop unnoticed by building occupants makes the Bookstore fire scenario a good candidate to satisfy design fire scenario 6. This fire scenario will be referred to as: Design Fire B.

Both models are discussed individually in more detail below.

One may refer to Figure 1.3 at the beginning of the report for a plan view of the areas under consideration.

Fire Modeling Tool Selection

This report will utilize Fire Dynamics Simulator (FDS) supported by the National Institute of Standards and Technology (NIST) to model a design fire scenario at the Student Center. FDS is described in the SFPE Handbook as a computational fluid dynamics (CFD) model. This model is based on conservation equations of mass, momentum, and energy with regards to the fire source and modeled space. Although a CFD model is designed to apply the conservation equations to every interaction within the modeled space, limitation on computational power require that such models look at the conservation equations from levels above the molecular scale.

Many studies have been performed to validate the results of FDS. These studies have compared both reconstructed fire scenarios and, more importantly, actual testing of the very model simulated by FDS. Such testing has involved both bench-scale and full scale testing.

This report will take advantage of the efforts to validate FDS to build a model framed by two validation studies. The first is outlined in Section 3.27.3 of the FDS Validation Guide and involves the NIST Full-Scale Enclosure Experiments, 2008. These experiments were used to study how fuel type and arrangement affected compartment fires. This study was chosen to provide information on modeling the compartment properties, such as the gypsum wallboard. The second study chosen was the NIST Smoke Alarm Experiments. These experiments involved testing the response of smoke detectors in a residential compartment. It is the author of this reports opinion that these validation studies shown FDS to be an appropriate fire model for the design fire scenarios selected.

Determining an estimate of the evacuation time (RSET) for occupants in the Student Center will be based on the *NFPA Fire Protection Handbook, 20th edition Chapter 2: Calculation Methods for Egress Prediction* (NFPA Handbook). The procedure is a simple hydraulic model of occupant movement based upon empirical data. The egress system must be designed so that the available safe egress time (ASET) does not exceed the required safe egress time (RSET).

Design Fire A

The following assumptions and determinations were made when designing the FDS simulation.

- The 159 sq. ft. area of the ASB Director office, Room 505, can be represented by a rectangular compartment with an average ceiling height of 14 ft.

- The door leading from Room 505 is modeled as open, and is considered a vent due to the size of the connecting areas.
- The walls and ceiling can be represented by gypsum wallboard, and the floors by concrete.
- The fire itself is taken to involve a trash bags placed in the corner of Room 505. Data for the heat release rate is taken from "Heat Release Rates of Burning Items in Fires", by Kim and Lilley. Figure 8.3 provides the heat release rate curve obtained from that study where a medium growth t-squared fire with a maximum heat release rate of 336 kW was reported for three paper-filled trash bags.

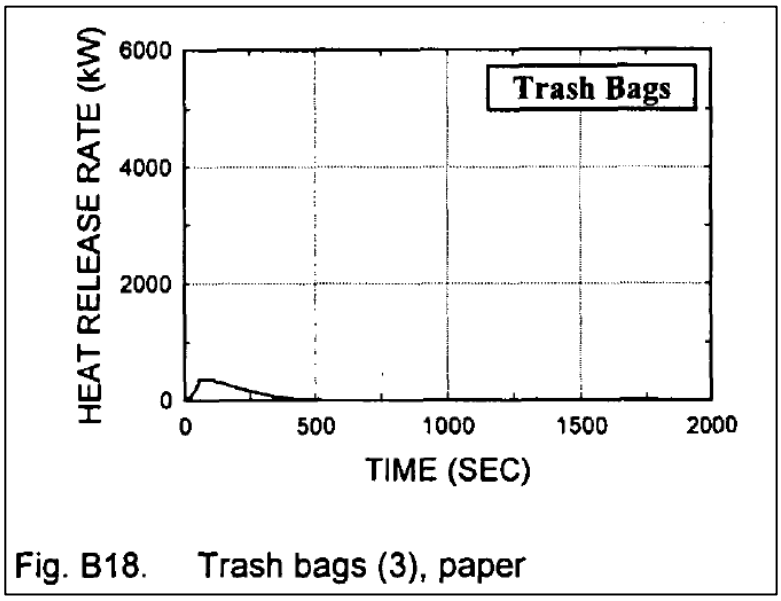

Figure 8.3: Design Fire A HRR Reference

- The simulation run time is to be 10 minutes. The fuel is modeled to grow to a maximum heat release rate and then burn at the maximum heat release rate until the heat content is reached, which occurs within 6 minutes after fire initiation.
- The effect of automatic sprinklers on the fire growth can be modeled in FDS. However, the effect of automatic sprinklers needs to be calibrated with actual test data corresponding to the conditions at hand. Given a lack of test data showing the effect of the particular fire sprinklers, fuel arrangement, and compartment conditions, this study cannot justify a particular extinguishing coefficient for use in the FDS model. What can be done is to use the most basic requirements of prescriptive fire sprinkler design: the fire sprinkler system is designed so that, once activated, it can limit the further spread of fire. For the FDS simulation, this means that when the fire sprinklers are activated, the heat release rate at the time of activation is held constant.
- The FDS mesh size is to be 0.2 m. This size is based on a sensitivity analysis of the mesh size on the calculation results, which started with a mesh size of 0.5 m.

- It is assumed that the fuel can be modeled as cellulose when determining combustion products. SFPE Handbook Table A.39 is referenced in selecting a soot yield of 0.015 (g/g). SFPE Handbook Figure 62.20 is referenced in selecting a CO yield of 0.01 (g/g).

Figure 8.4 below shows the layout of the FDS model. The following legend will help to distinguish the elements of the model.

1. ASB Office (Room 505)
2. Game Area/TV Lounge Area
3. Trash modeled as fire source

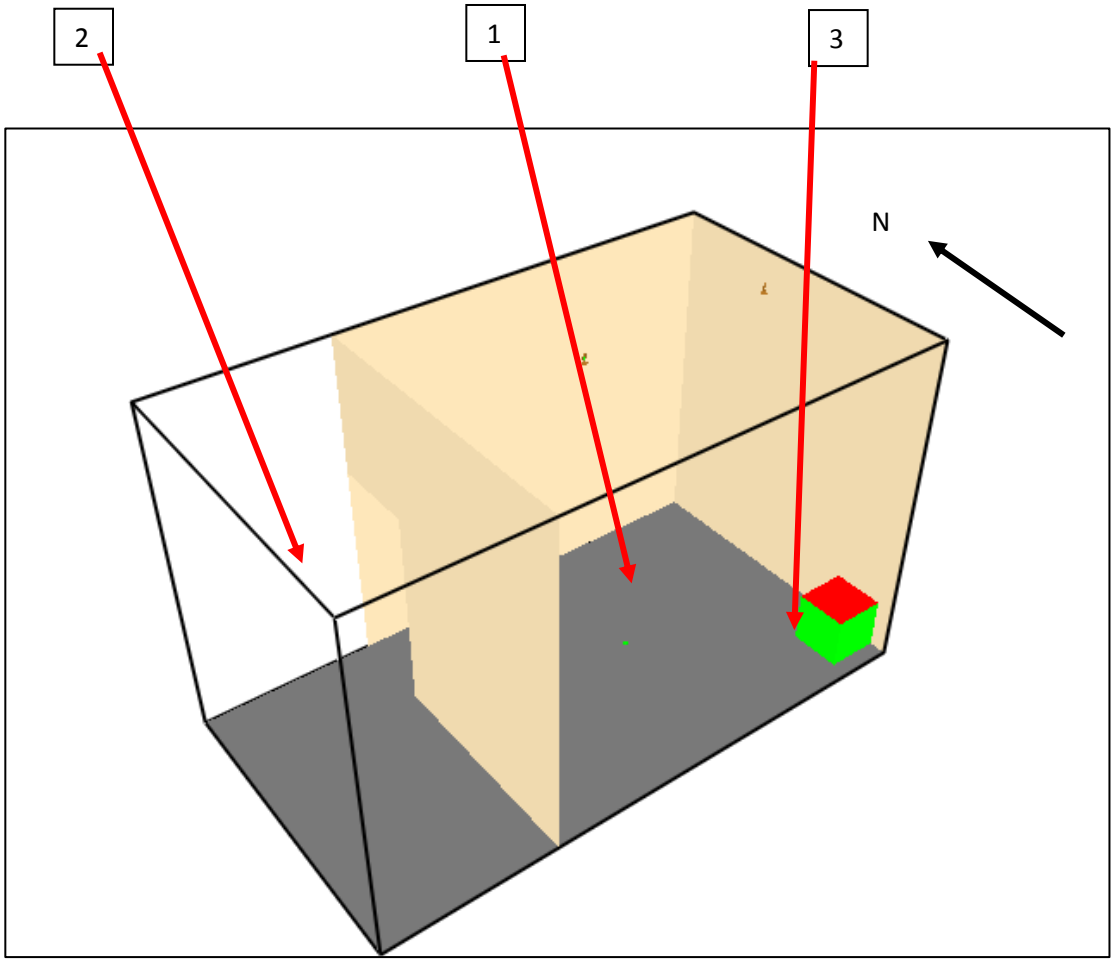

Figure 8.4: Design Fire A FDS Model Layout

Results

The FDS simulation results show a minimum tenability period of 1 minutes, 30 seconds for Design Fire A. Visibility tenability criteria is exceeded with regards to the smoke layer height at 1 minute, 30 seconds. An overview of all the findings is presented below.

- First sprinkler activation occurred at approximately 107s after fire initiation. This is shown in Figure 8.5, which presents a graph of the sprinkler temperatures for the time of interest. The sprinklers are Viking VK 352 with an activation temperature of 68 °C (155 °F).

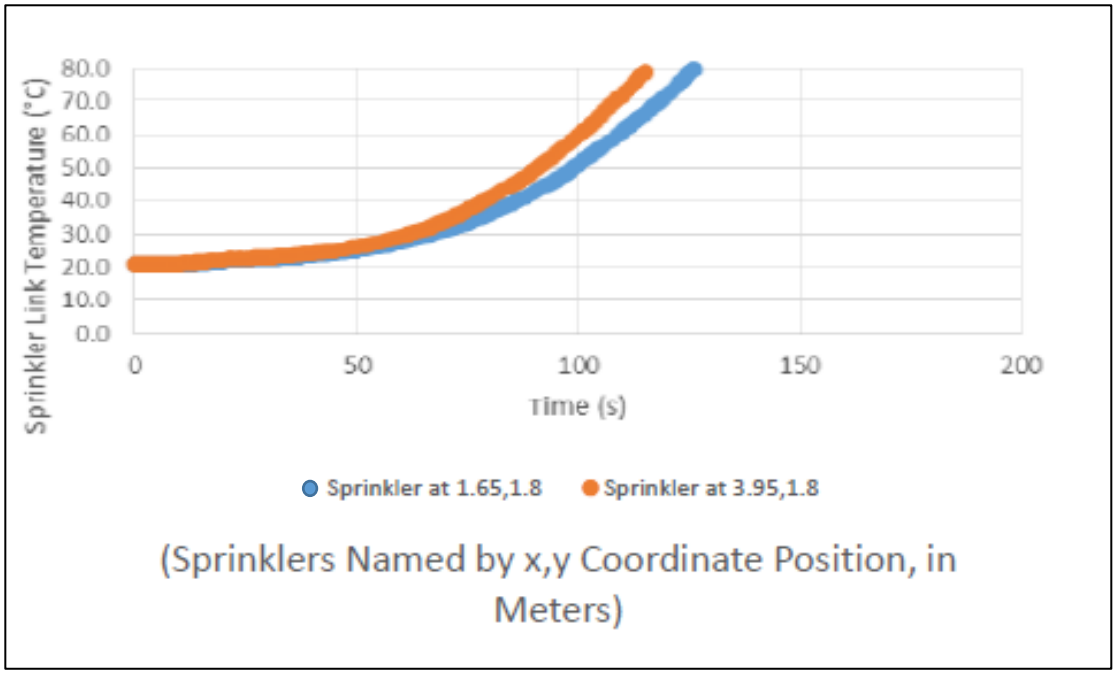

Figure 8.5: Design Fire A Sprinkler Activation

- **Visibility reaches tenability limit at 90s (1 minute, 30 seconds).** Figure 8.6 shows the smoke layer height reaching the tenability limit of 1.8 m (6 ft.) at approximately 90 seconds, prior to visibility being reduced to 10 m.

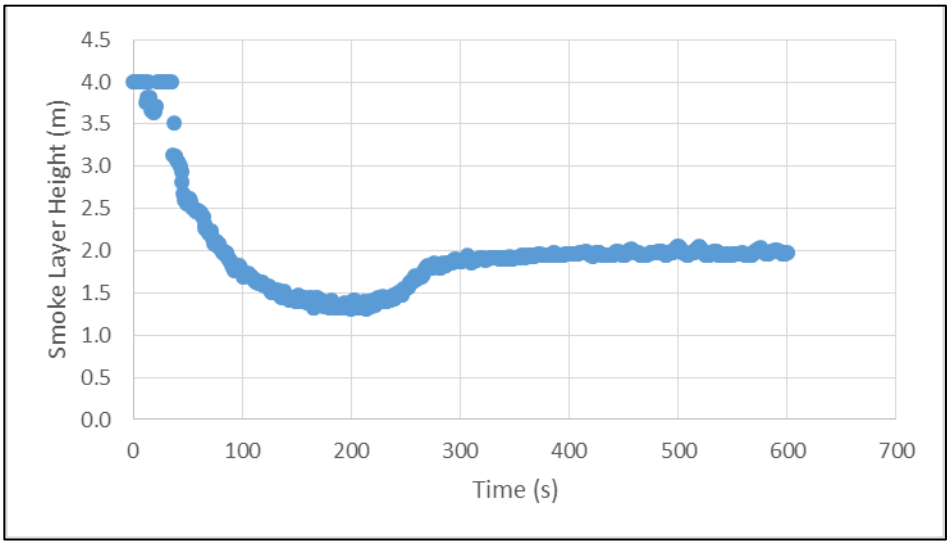

Figure 8.6: Design Fire A Smoke Layer Height vs Time

Visibility is reduced to 10 m at approximately 136s. Equations 16.5 and 16.6 from the FDS User Guide are used to convert FDS data on soot concentrations to a visibility distance based on a mass extinction coefficient of 8700 m^2/kg. It is also assumed that occupants will be guided by light emitting signs. Working backwards, a value of 10m for visibility is associated with a soot concentration of $9.20x10^{-5}$ kg/m^3. Figure 8.7 below shows when this value is reached in the doorway at a height of 1.8m.

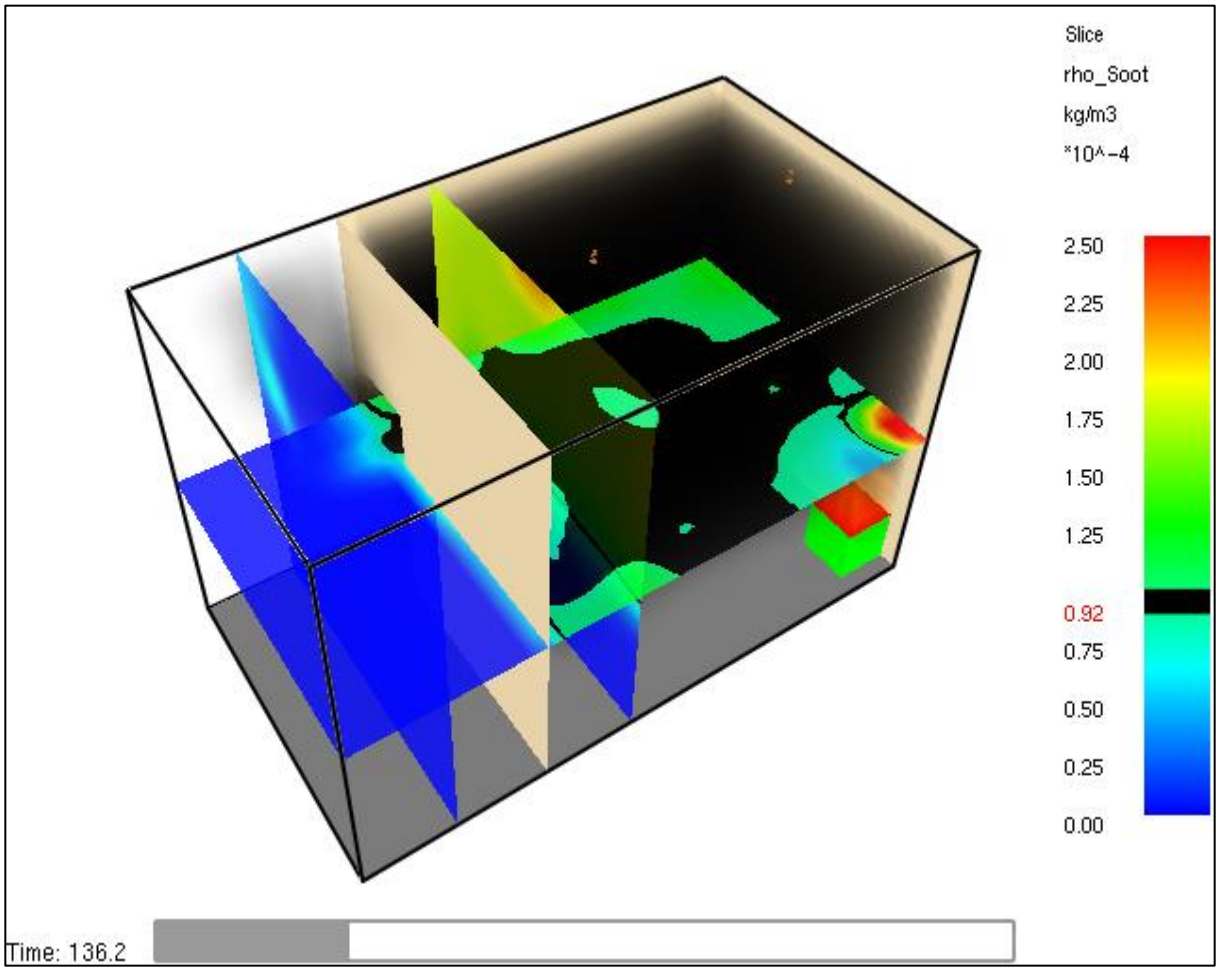

Figure 8.7: Design Fire A Soot Density at Tenability Limit

- **CO exposure does not exceed the tenability limit.** Figure 8.8 below shows a maximum $1.5x10^{-4}$ ppm CO concentration being reached during the simulation, which is below the tenability limit criteria.

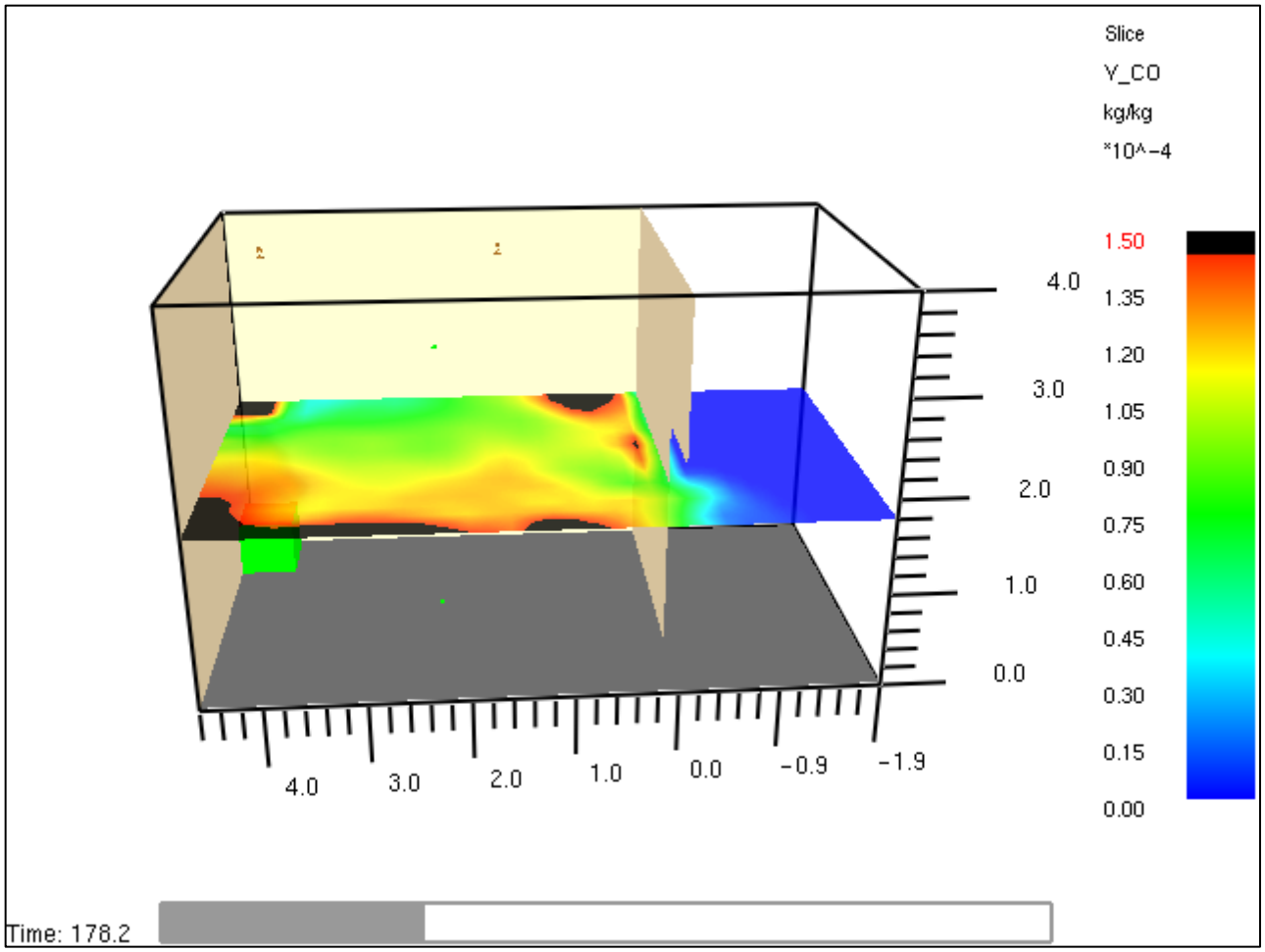

Figure 8.8: Design Fire A CO Concentration at Selected Time

- **Temperature criteria reached at 123s (2 minutes, 3 seconds).** The temperature in the doorway reaches 60 °C at approximately 123s. Figure 8.9 shows how the threshold temperature encroaches into the doorway at the time when tenability is reduced.

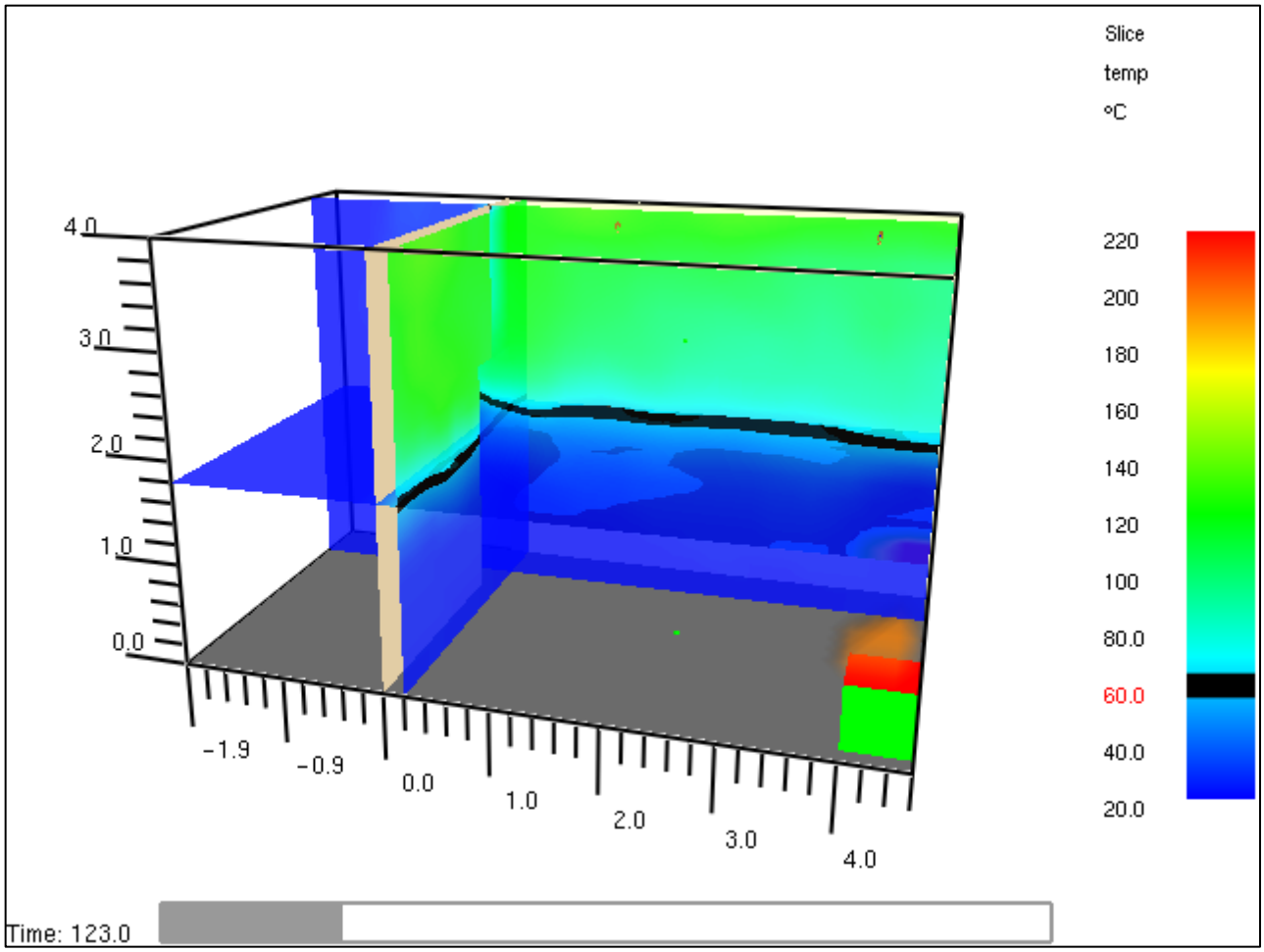

Figure 8.9: Design Fire A Temperature Profile at Tenability Limit

- **Flashover criteria are not reached**. Figure 8.9 above shows a time when the largest ceiling temperature, 220 °C, is reached. The largest heat flux to the floor was 0.24 kW/m^2.

Design Fire B

The FDS model was built with the following assumptions and determinations:

- The 1282 sq. ft. area of the Bookstore can be represented by a square compartment with an average ceiling height of 20 ft.
- The door to the Room 504: Mail Room would be closed during a fire event.
- The door to the Room 511: Office would be closed during a fire event.
- The opening into the Delivery area requires that the Delivery area be represented. The exit door located in the Delivery area is assumed to be closed during a fire event.
- The East Entry Vestibule exit door is to remain closed, while the opening of this space in to the Game Room can be considered a vent.

- The exit door in the Northeast Corner can be modeled as closed.
- The walls and ceiling can be represented by gypsum wall board, and the floors by concrete.
- The fire itself is taken to involve two bookcases located on the East wall of the Bookstore. A quantity of two bookcases are assumed to be involved at a given time. Substantiation of the heat release rate of the bookcases is provided by a US Department of Commerce report titled "Quick Response Sprinklers in Office Configurations: Fire Test Results." This study referenced a burn test of storage shelves containing paper products where the heat release rate was measured, Test 202 in the study. Heat release rate data is shown in Figure 8.10 below. The curve was simplified to a maximum heat release rate of 1400kW sustained for a period of 190s. Unfortunately, the effect of the sprinkler system was not considered as the shelves were allowed to burn freely. The shelf configuration is shown in Figure 8.11.

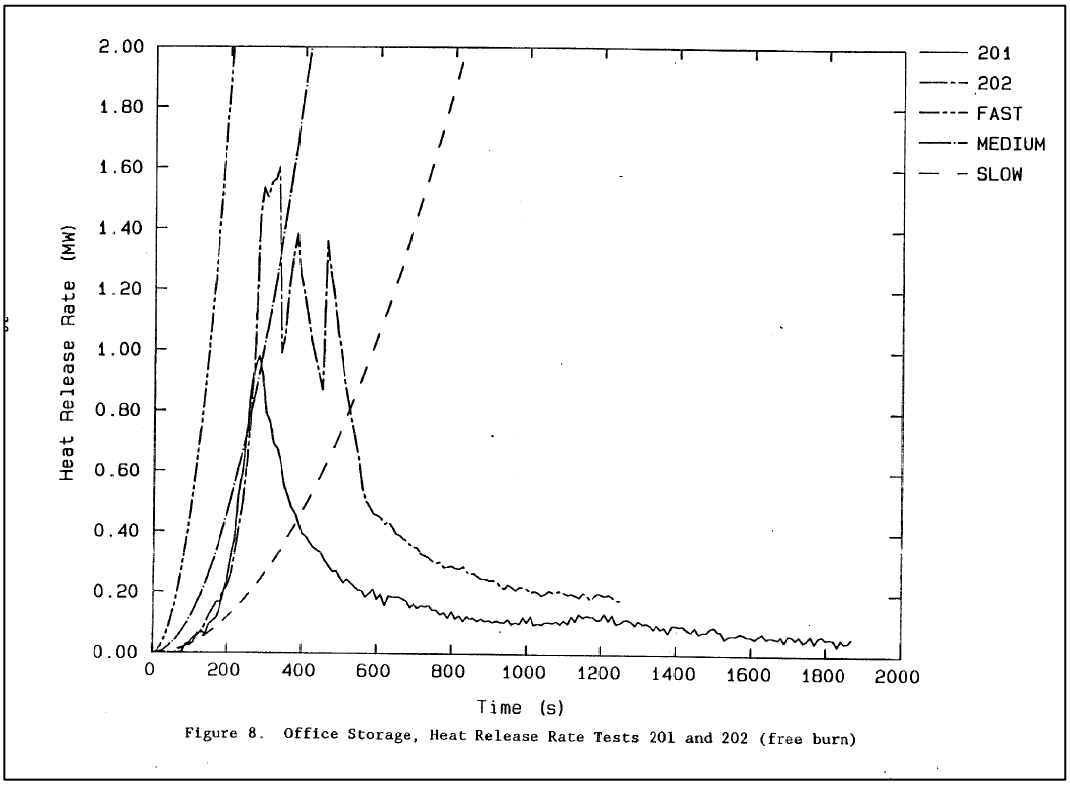

Figure 8.10: Design Fire B HRR Reference

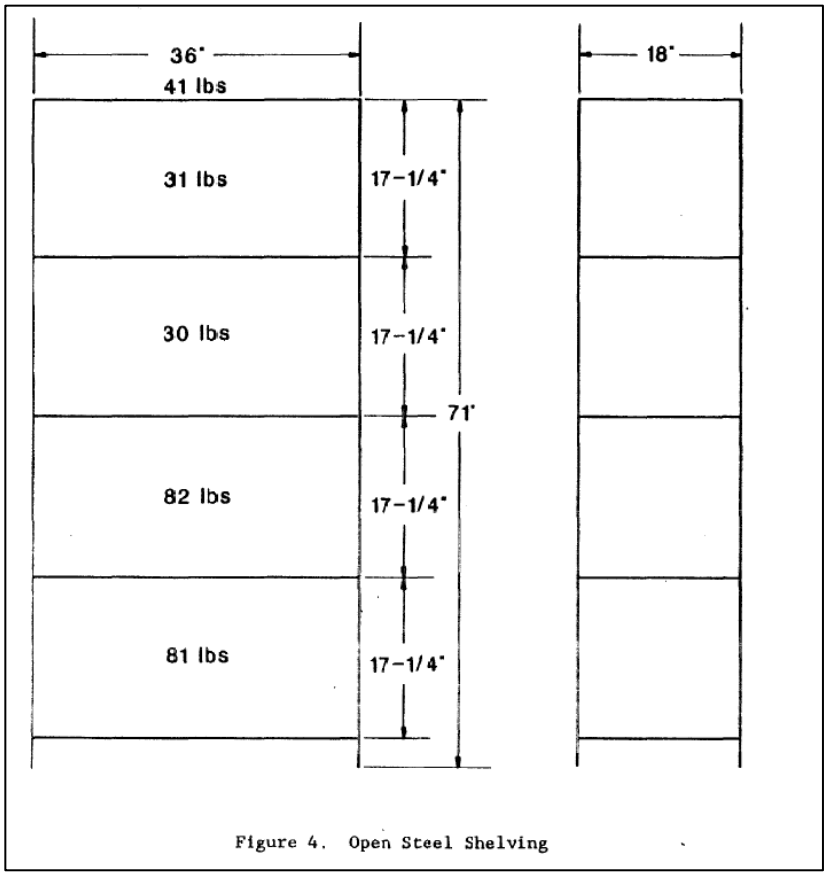

Figure 8.11: Design Fire B Shelf Configuration

- The simulation run time is to be 20 minutes. The potential for fire to spread to adjacent cabinets means that it is reasonable to assume that two shelves are burning at any given time. Therefore, the fuel potential is not limited for the time under consideration.
- The effect of automatic sprinklers on the fire growth can be modeled in FDS. However, the effect of automatic sprinklers needs to be calibrated with actual test data corresponding to the conditions at hand. Given a lack of test data showing the effect of the particular fire sprinklers, fuel arrangement, and compartment conditions present at the Student Center Bookstore, this study cannot justify a particular extinguishing coefficient for use in the FDS model. What can be done is to use the most basic requirements of prescriptive fire sprinkler design: the fire sprinkler system is designed so that, once activated, it can limit the further spread of fire. For the FDS simulation, this means that when the fire sprinklers are activated, the heat release rate at the time of activation is held constant.
- The FDS mesh size is to be 0.2 m. This size is based on a sensitivity analysis of the mesh size on the calculation results, which started with a mesh size of 0.5 m.
- It is assumed that the fuel can be modeled as cellulose when determining combustion products. SFPE Handbook Table A.39 is referenced in selecting a soot yield of 0.015 (g/g). SFPE Handbook Figure 62.20 is referenced in selecting a CO yield of 0.01 (g/g).

Figures 8.12 and 8.13 below show the layout of the FDS model. The following legend will help to distinguish the elements of the model.

1. Bookstore area
2. Deliver area
3. East Vestibule
4. Cabinets with books modeled as the fire source

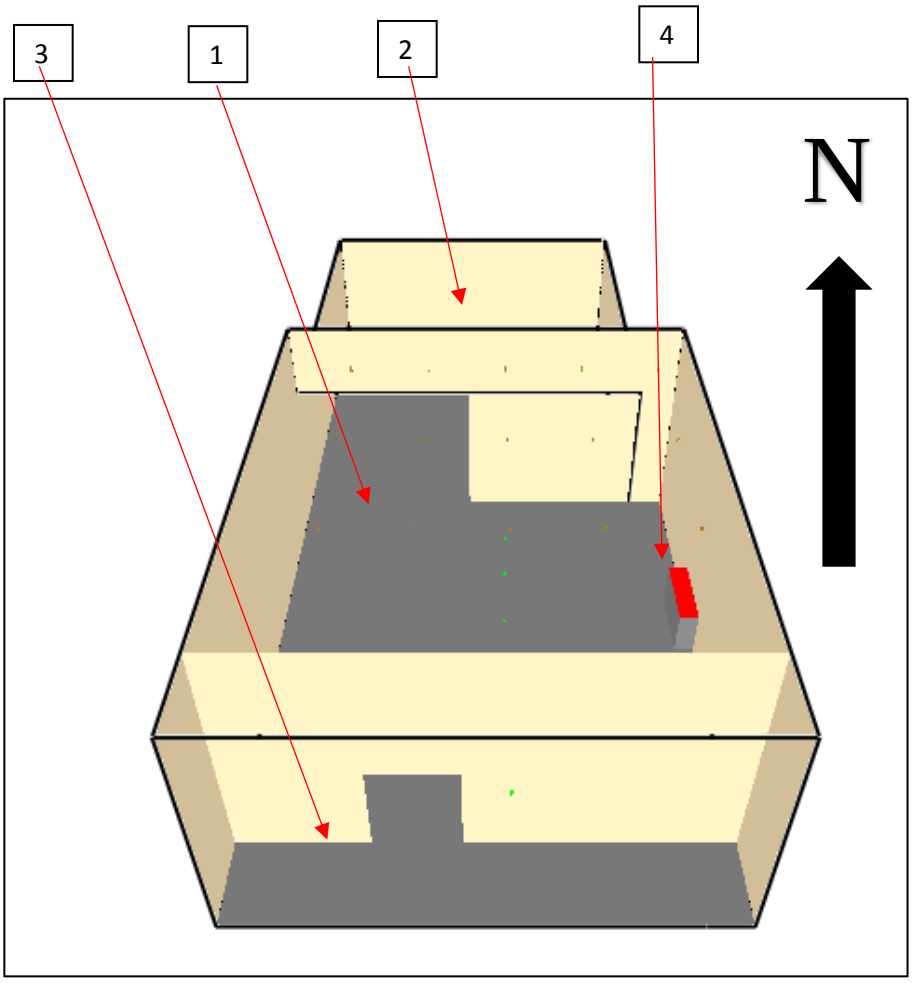

Figure 8.12: Design Fire B FDS Model Layout

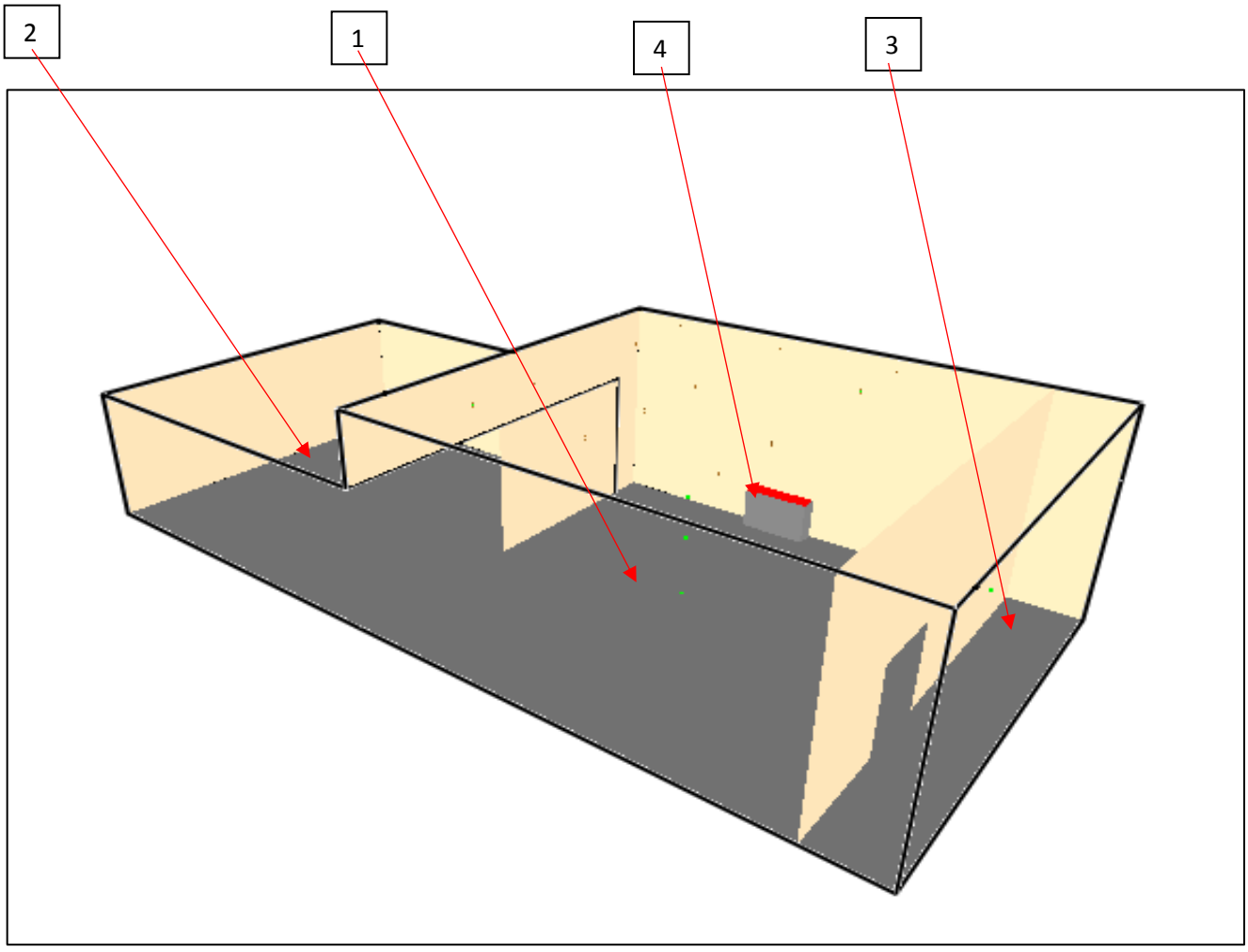

Figure 8.13: Design Fire B FDS Model Layout

Results

The FDS simulation results show a minimum tenability period of 8 minutes, 27 seconds for Design Fire B. Visibility tenability criteria is exceeded with regards to the visibility distance at 8 minutes, 27 seconds. It is also important to note that the time to the first sprinkler activation is 120 seconds. An overview of all the findings is presented below.

- First sprinkler activation occurred at approximately 120s after fire initiation. This is shown in Figure 8.14, which presents a graph of the sprinkler temperatures for the time of interest. The sprinklers are Viking VK 352 with an activation temperature of 68 °C (155 °F).

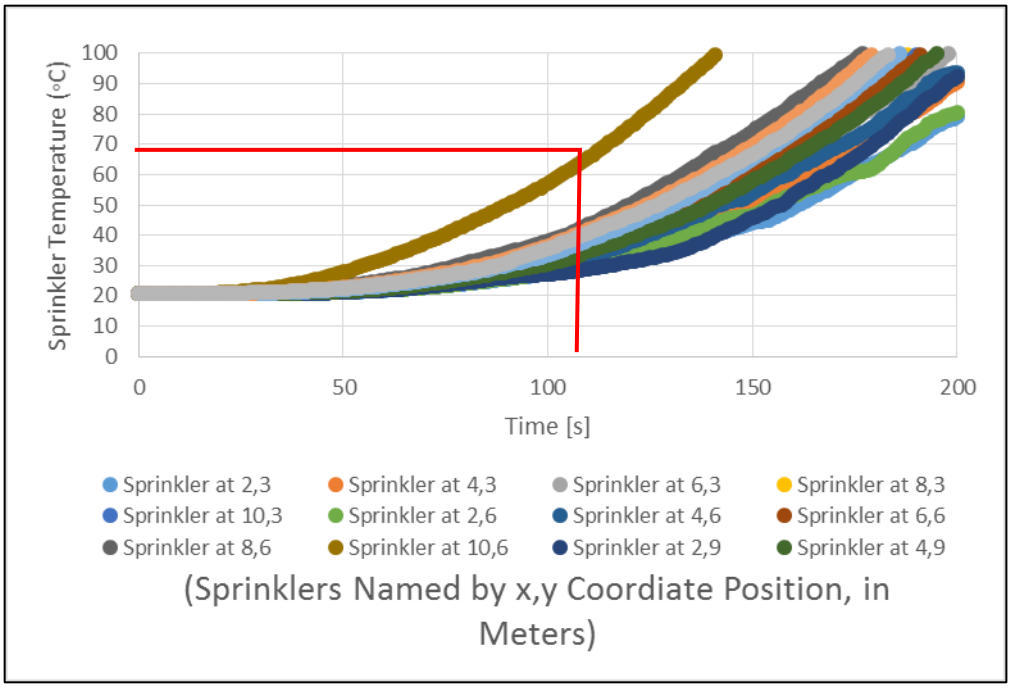

Figure 8.14: Design Fire B Sprinkler Temperature vs. Time

- The heat release rate at the time of sprinkler activation was approximately 450 kW as shown in Figure 8.15 below. This heat release rate was then held steady for the remainder of the simulation in accordance with the discussion above.

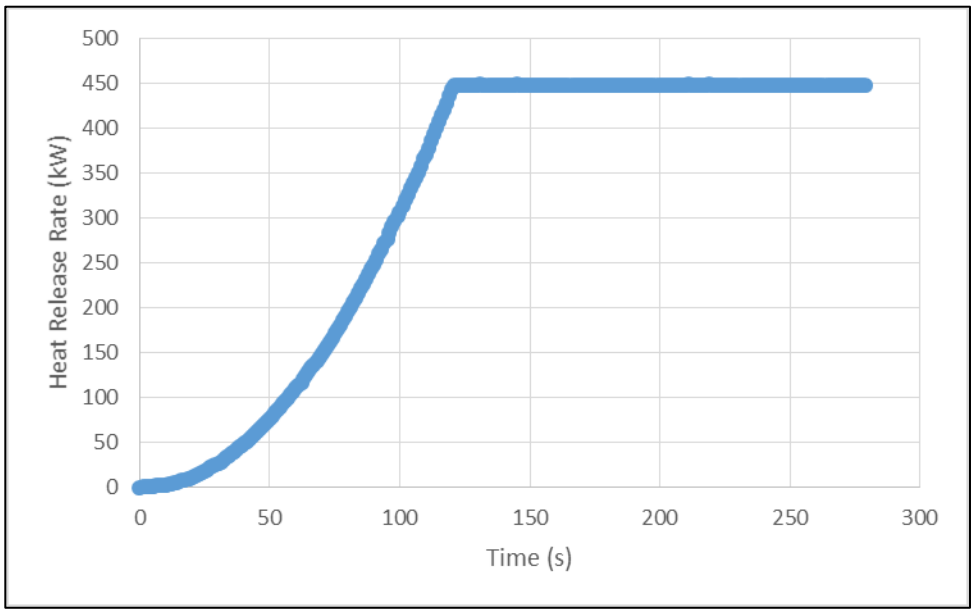

Figure 8.15: Design Fire B Heat Release Rate vs. Time

- **Visibility is tenable until 507s (8 minutes, 27 seconds).** Equations 16.5 and 16.6 from the FDS User Guide are used to convert FDS data on soot concentrations to a visibility distance based on a mass extinction coefficient of 8700 m^2/kg. It is also assumed that occupants will be guided by light emitting signs. Working backwards, a value of 10m for visibility is associated with a soot concentration of $9.20x10^{-5}$ kg/m^3. Figures 8.16 and 8.17 below show that this value is reached in the East Vestibule after 507s. Note that the black slider is placed on the density scale on the right of the figure at a value of $9.20x10^{-5}$ kg/m^3. Then then black lines on the model space indicate where this value is present. One can see that the pathway in the East Vestibule and the surface leading into the Game Area begin to experience "fingering" of the soot density limit around 507s.

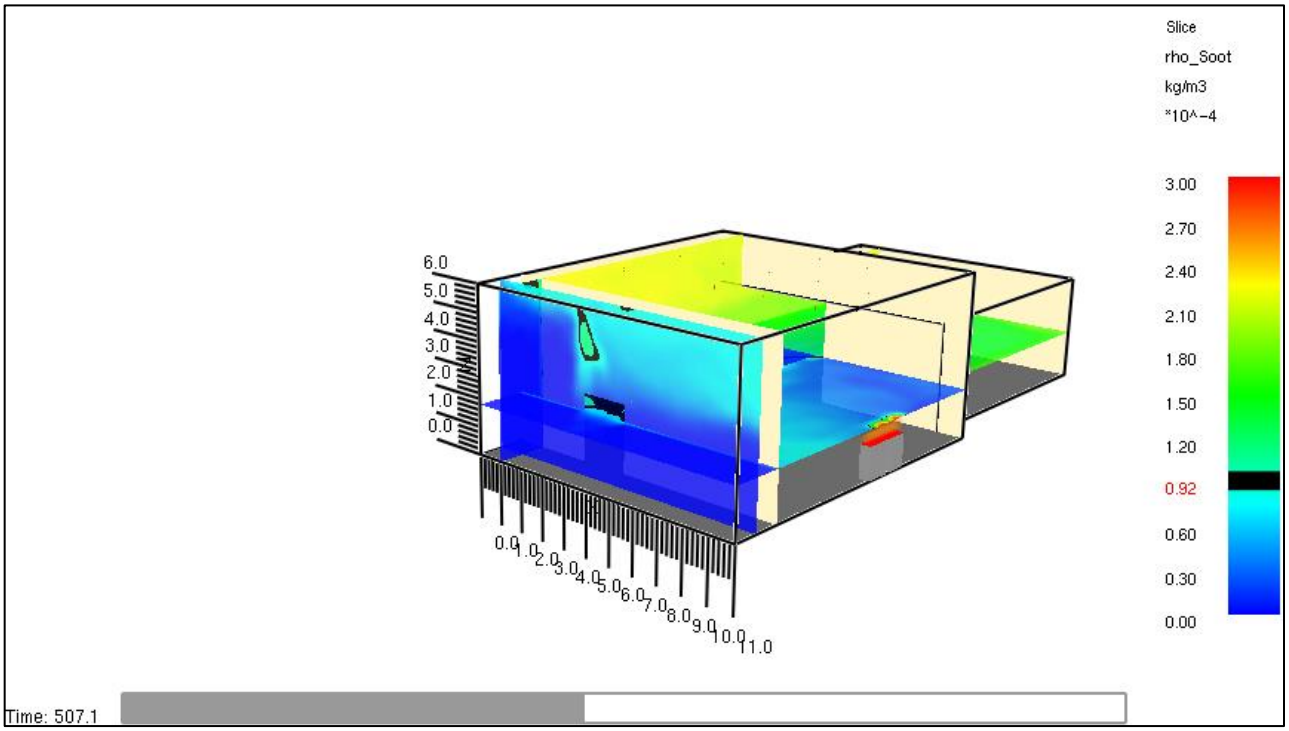

Figure 8.16: Design Fire B Soot Density at Visibility Limit

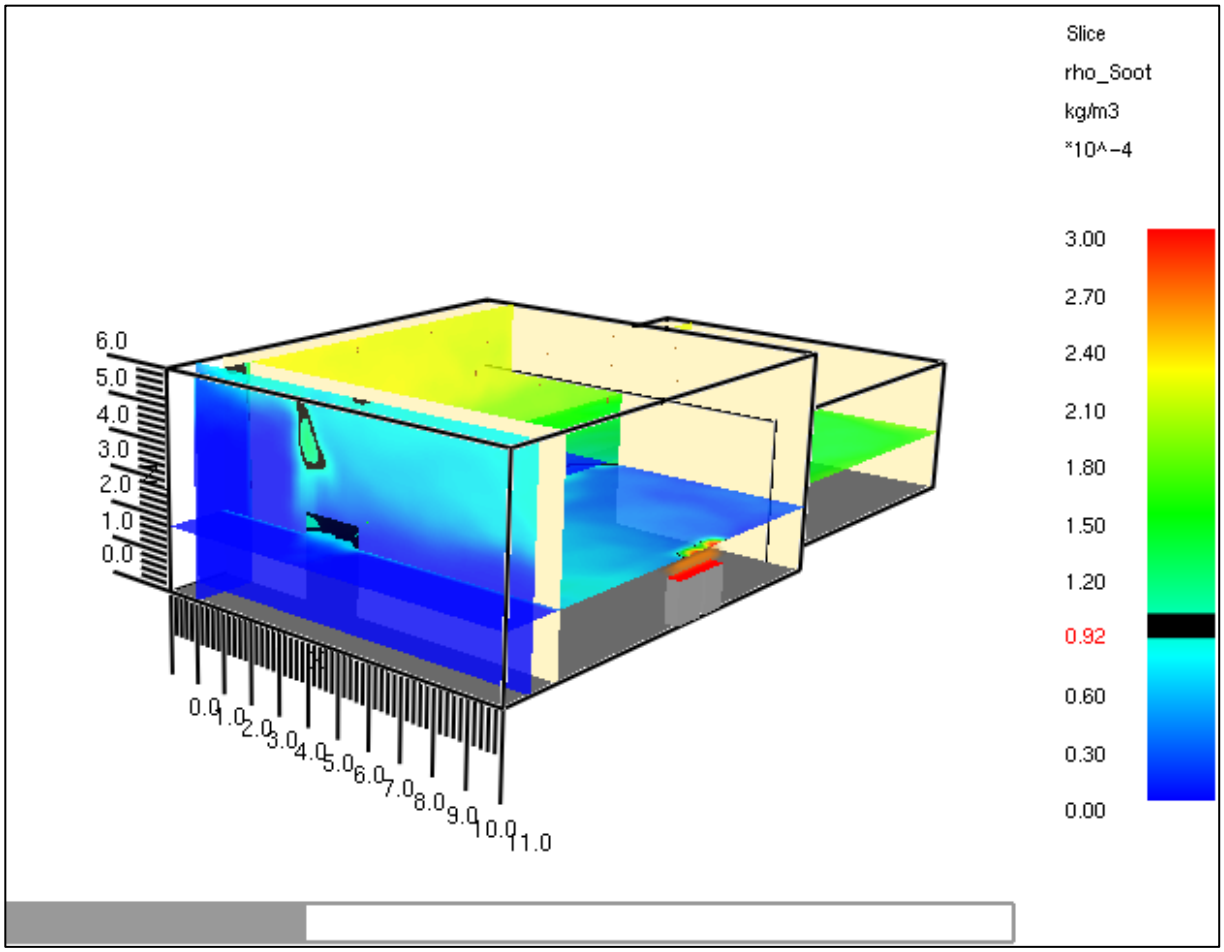

Figure 8.17: Design Fire B Soot Density at Visibility Limit

The smoke layer height does not reach 1.8 m in the East Vestibule at any time during the simulation as shown in Figure 8.18 below.

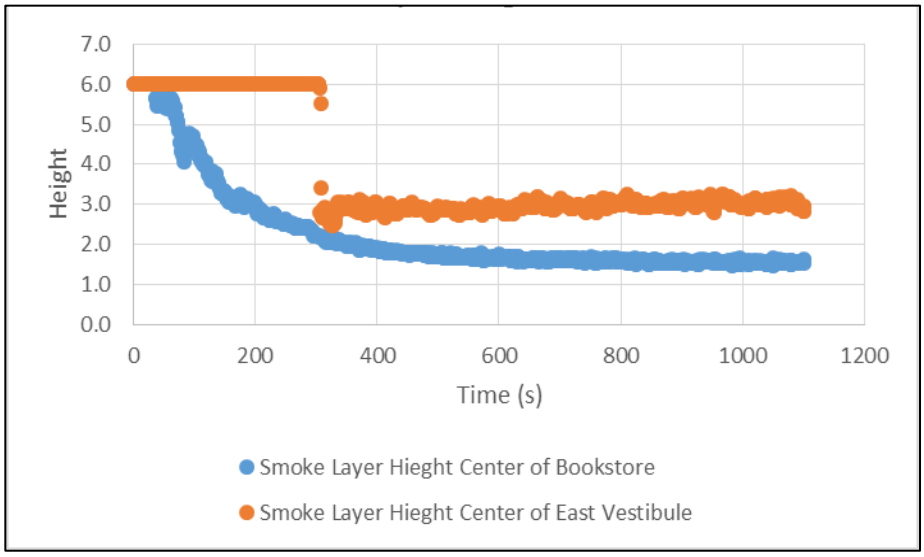

Figure 8.17: Design Fire B Smoke Layer Height vs Time

- **CO exposure tenability limit is not reached.** A maximum CO concentration of 1.5 x 10^{-4} ppm was found in the East Vestibule This value is below the tenability threshold of 3.0 x 10^{3} ppm, which means that tenability regarding CO exposure is maintained. The state of the simulation at the highest CO concentration, at a time of 1060 s, in the East Vestibule is shown in Figure 8.18.

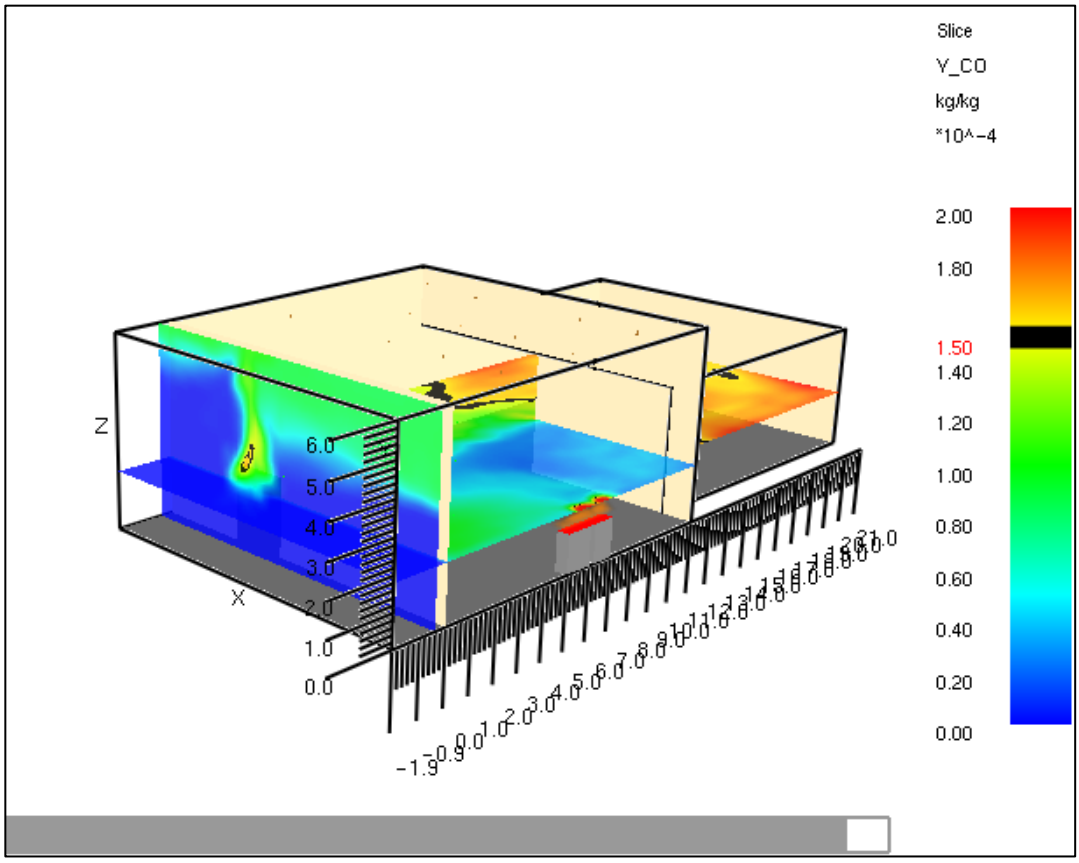

Figure 8.18: Design Fire B CO Concentration at Tenability Limit

- **Temperature tenability limit is reached at 545s (9 minutes, 5 seconds).** The temperature at a height of 1.8 m in the East Vestibule doorway reaches 60 °C at approximately 545s. Figure 8.19 below shows the compartment and the regions at the limit temperature with a black bar.

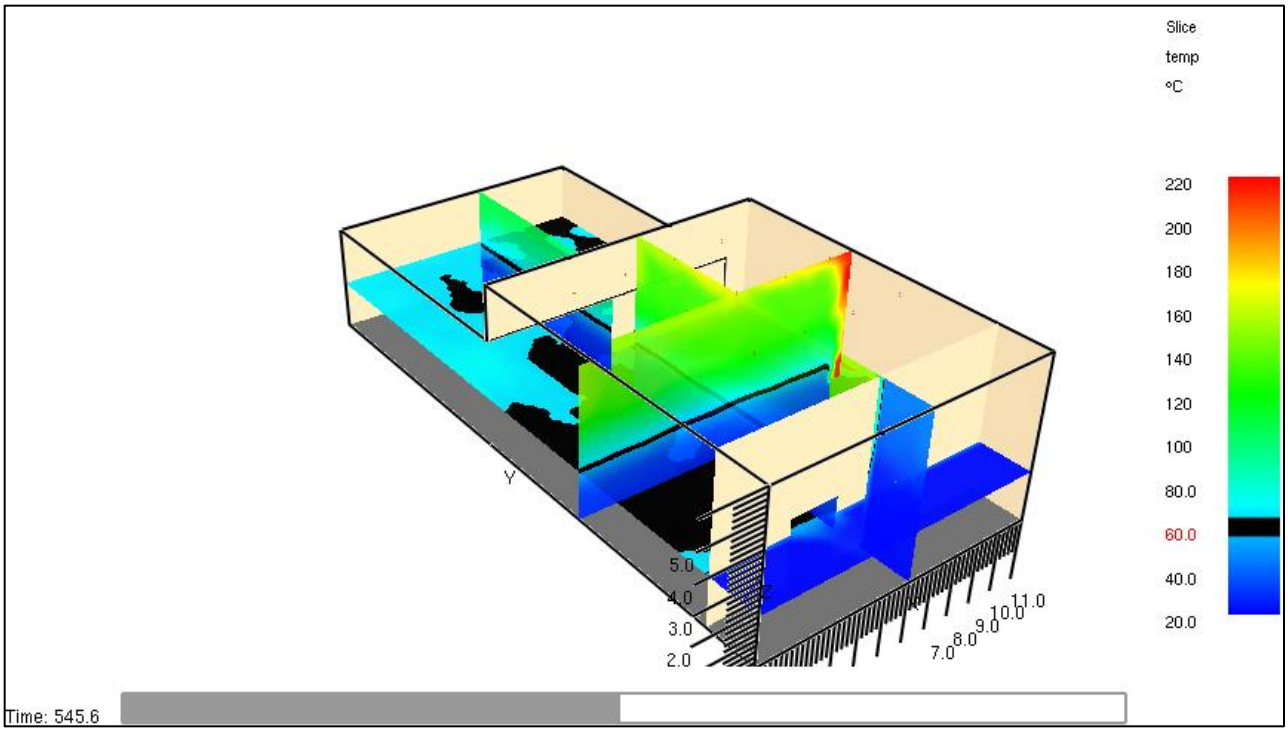

Figure 8.19: Design Fire B Temperature Tenability Limit

Onset of flashover does not occur according to the FDS simulation. Figure 8.20 shows that the heat flux to the floor does not reach the defined condition for flashover, 20kW/m^2.

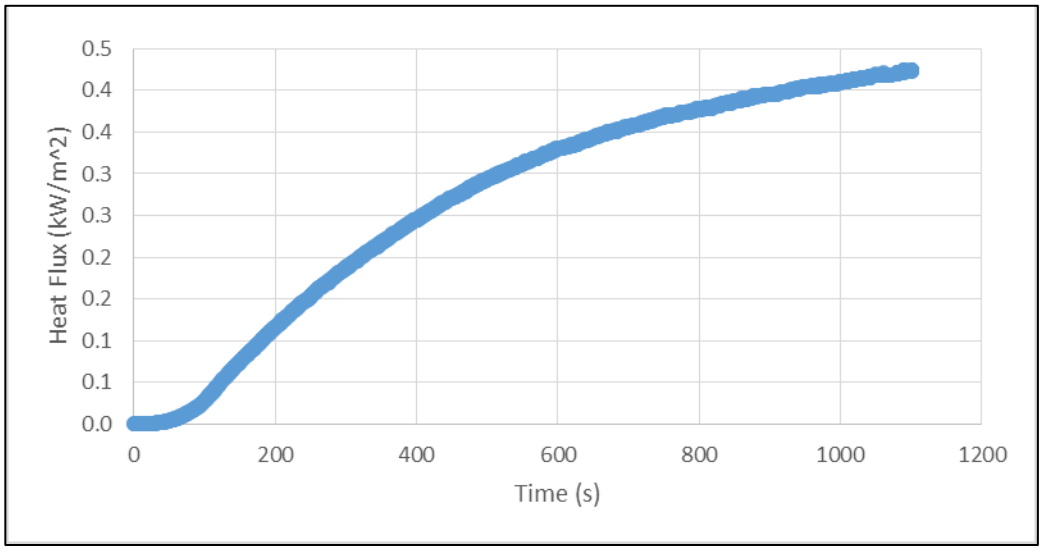

Figure 8.20: Design Fire B Heat Flux vs Time

Figure 8.21 shows that during the 20 minute simulation, the maximum wall temperature at the ceiling level reached is approximately 220 °C, which is below the flashover criteria of 500 °C.

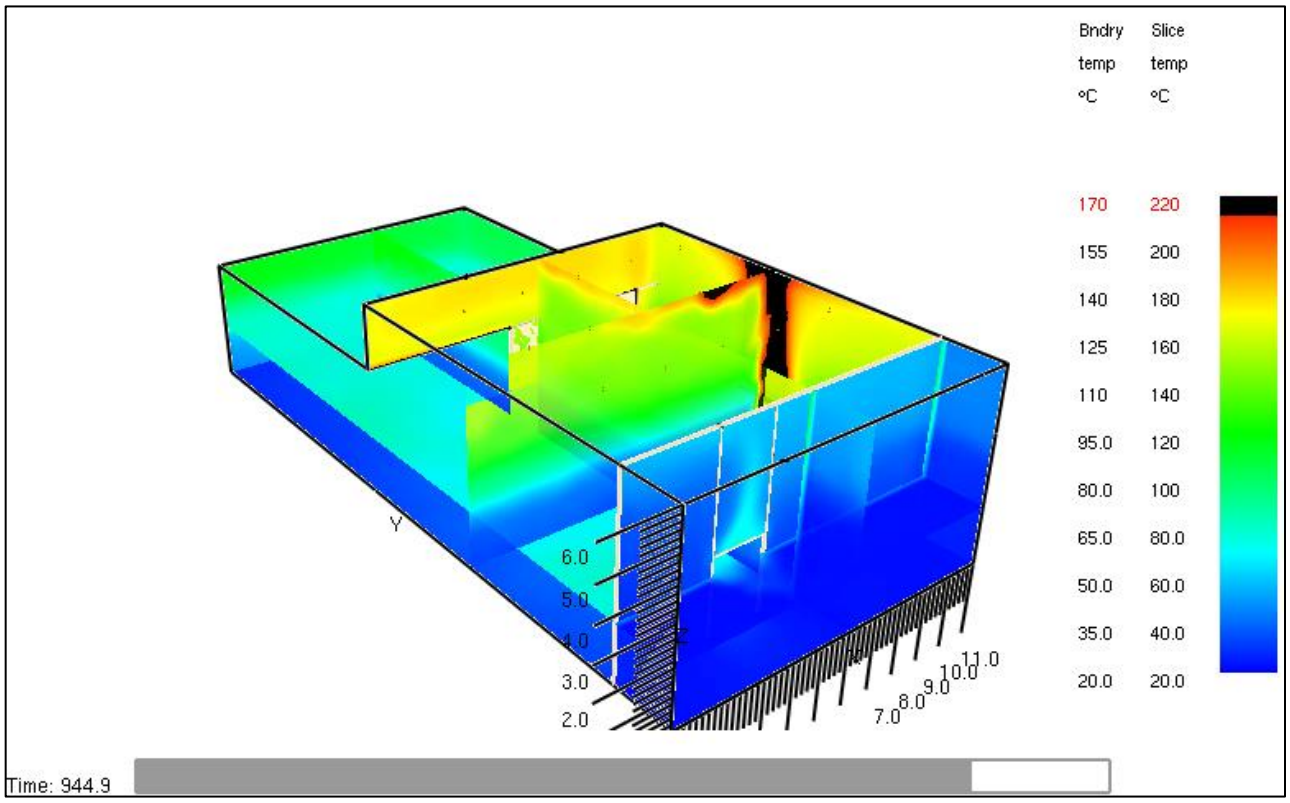

Figure 8.21: Design Fire B Maximum Temperature Profile

Performance Based Design for Occupant Egress

Thus far it has been established that the Student Center meets the prescriptive requirements with regards to egress systems per the 2015 IBC. It is now time consider a how fast the occupants can evacuate from the building. This step is considered performance-based design in that it goes beyond what is defined in and required by applicable building codes.

Occupant Characteristics

The Student Center will be occupied primarily by college students, faculty, and facilities personnel. It is also possible to have community members not associated with the campus visiting the Student Center. Factors that will have an impact on pre-evacuation times and egress travel times are discussed for each group below.

Students

- 18-32 years of age and generally in good health.
- Favorable reaction times to emergency notifications and conditions.

- Capable of swift egress movement.
- Will tend to remain with familiar cohorts, which may delay egress times and result in higher-than-expected population density.
- Very familiar with the building layout.

Faculty

- Mature adults in good to fair health conditions
- Moderate to swift egress movement.
- Favorable reaction times to emergency notifications and conditions.
- Trained to act as facilitators for evacuation, making sure egress from their respective classrooms takes place.
- Very familiar with the building layout.

Facilities Staff

- Mature adults in good to fair health conditions
- Moderate to swift egress movement.
- Favorable reaction times to emergency notifications and conditions.
- Very familiar with the building layout.

Community Members

- Most characteristics will fall into one of the groups discussed above.
- Will not be familiar with the building layout.

For three of the groups familiarity of the building is enhanced by evacuation drills that are conducted periodically throughout the year. It is also noteworthy that there is a dedicated security force on campus that will help clarify the nature of emergencies and assist in the proper evacuation of the building, which is particularly important for visiting community members.

One factor that will slow the total building egress time is the presence of physically impaired individuals. It is possible that such individuals will be a part of the occupant population and will either require or receive help from others.

Components of Travel Time

As described in NFPA Handbook Chapter 4, there are four parts to determining RSET:

1. Time to notification
2. Reaction Time
3. Pre-evacuation activity time
4. Travel/Movement Time

Delay Time Pre-Evacuation Activities

Handbook Table 4.2.1 provides the results of the total delay times for various scenarios. For the Student Center there is a good match between two scenarios. The first involved a single story department store where an unannounced fire drill was conducted. The second involved another study on a single story department store.

For this building there is a mix of typical and unique activities that the building occupants are likely to engage in before beginning the evacuation process. The typical activities include:

- Gather backpacks, books, supplies.
- Put on outerwear when outside conditions are cold or rainy.
- Find and congregate with close friends.
- Unplug and pack laptop computers.

Unique pre-movement activities concern the laboratories located on each floor of the building.

- Shutdown lab equipment.
- Personnel cleanup/disinfection from lab activities.

Chapter 4 of the NFPA Handbook discusses how such studies have a hard time separating delay time and pre-movement times. Based on this, and the discussion of pre-movement activities below, the maximum delay time from the two studies will be taken, and this time is to represent both the reaction time and pre-movement activity time.

The delay plus pre-movement time for both Design Fire Scenario A and Design Fire Scenario B is to be 0.5 minutes, or 30 seconds.

RSET for Design Fire A

Determining an appropriate travel time will start with the assumption that the only egress component affected by the design fire in Room 505 will be the doorway for Room 505. For the office fire scenario the procedure for calculating the travel time is straightforward:

1. Calculate the time for the occupants in Room 505 to exit this area via the doorway.
    - Maximum travel distance: 15ft.
    - Travel speed (ft./min): 235 [Handbook Table 4.2.7]
    - Travel Time (seconds): 4

It should take 4 seconds, or less, for the occupants to reach and egress from the doorway of Room 505.

Notification of the fire should occur immediately for occupants in Room 505. The delay/pre-movement time is 30 seconds. Therefore, the RSET for Office fire scenario is found by taking the total of the RSET components, 34 seconds, and multiplying by a safety factor of 1.2. The total RSET is then 41 seconds.

RSET for Design Fire B

Determining an appropriate travel time will start with the assumption that the Bookstore fire will impact the East Vestibule. This in turn can possibly prevent use of this corridor and delay egress times for the building. It could also affect occupants coming from the bathrooms, which exit directly into the East Vestibule. Therefore, the approach taken is to consider the time it takes for all occupants to exit the Student Center. This approach will ensure that no occupants are trapped by untenable conditions in the East Vestibule. For the bookstore fire scenario the procedure for calculating the travel time is as follows:

1. Calculate the time for occupants to travel from the most remote point of the ASB Office and into the Student Commons.
2. Use the time calculated in step 1 to determine the number of persons that have exited from the Student Commons assuming a uniform distribution of occupants.
3. Use the time calculated in step 1 to determining the number of persons that have entered the Student Commons from other areas, to include the ASB Director Office and the Food Service area.
4. Combine the increase in occupants from steps 1 and 3 with the decrease of occupants from step 2 with regards to the Student Commons area. Then determine the time it takes of the occupants entering the Student Commons from the ASB Office to reach and pass through the nearest exit doorway.

These steps are presented in Table 8.1 below.

Table 8.1: Design Fire B Travel Time Calculation

Step 1		
Max Travel Distance to Door (ft)	25	
Max Travel Speed (ft/min)	235	Handbook Table 4.2.7
Travel Time (minutes)	0.2	
Doorway Flow		
Clear Width (in)	36	
Effective Width (in)	24	SFPE Handbook Table 4.2.4
Max Specifc Flow p/min/ft	24	SFPE Handbook Table 4.2.8
Max Flow through door (p/min)	48	
Occupants	5	
Travel Time (minutes)	0.2	
Total Time (minutes)	**0.4**	

Step 2		
Doorway Flow		
Density (persons/sq.ft.)	0.10114	Less than 0.175
Clear Width (in)	72	SFPE Handbook Figure 4.2.7
Effective Width (in)	60	Continue Use of Max Flows
Max Specifc Flow p/min/ft	24	
Max Flow through door (p/min)	120	
Travel Time (minutes)	0.4	
Number of Occupants Egressed	**48**	

Step 3	
Doorway Flow - Food Service	
Clear Width (in)	72
Effective Width (in)	60
Max Specifc Flow p/min/ft	24
Max Flow through door (p/min)	120
Travel Time (minutes)	0.4
Occupant Increase (Less than the total expected increase)	48
Doorway Flow - ASB Director	
Clear Width (in)	36
Effective Width (in)	24
Max Specifc Flow p/min/ft	24
Max Flow through door (p/min)	48
Travel Time (minutes)	0.4
Max Occupant Increase (More than the total expected increase)	19.2
Actual Occupant Increase	2
Doorway Flow - ASB Office	
Clear Width (in)	36
Effective Width (in)	24
Max Specifc Flow p/min/ft	24
Max Flow through door (p/min)	48
Travel Time (minutes)	0.4
Max Occupant Increase (More than the total expected increase)	19.2
Actual Occupant Increase	5
Total Addition of Occupants To The Path of Egress	**55**

Step 4		
		Density is Less than 0.175
Density (persons/sq.ft.)	0.103854	SFPE Handbook Figure 4.2.7
Max Travel Distance to Door (ft)	120	Continue Use of Max Flows
Max Travel Speed (ft/min)	235	Handbook Table 4.2.7
Travel Time (minutes)	0.6	
Doorway Flow		
Clear Width (in)	72	
Effective Width (in)	60	SFPE Handbook Table 4.2.4
Max Specifc Flow p/min/ft	24	SFPE Handbook Table 4.2.8
Max Flow through door (p/min)	120	
Occupants	291	
Travel Time (minutes)	2.5	
Total Time (minutes)	**3.1**	
Grand Total for Travel Time (min)	**3.5**	

From these steps the total travel time is approximately 3.5 minutes. With a notification time of 120s, and a delay time of 30s, the total egress time comes to 6 minutes. This time should be multiplied by a factor of 1.2 to give a satisfactory RSET value of 7 minutes, twelve seconds.

RSET vs. ASET

The analysis of Design Fire A found that ASET (1 minute, 30 seconds) exceeds RSET (34 seconds).

The analysis of Design Fire B found that ASET (8 minutes, 27 seconds) exceeds RSET (7 minutes, 12 seconds).

Performance-Based Design for Fire Barrier Joints

With a non-rated roof assembly, it would not be possible for head-of-wall joints to comply with Section 715. Fortunately, IBC Section 707.9 allows that joints between a fire barrier and non-rated roof or wall assemblies be protected with less stringent methods. It is only required that an approved system or material be installed that is secured in place, can retard the passage of flame and hot gases, and accommodate building movement. In practice, there are no readily available means to represent that these requirements have been met without referring to tested and listed assemblies. Therefore, it is recommended that listed firestop joint systems be used as a basis of design. There are a number of such systems involving concrete over metal deck assemblies, which

is comparable to the metal deck assembly to be used at the Student Center. The listed firestop joint systems by default meet the requirements for preventing flame and temperature passage, but they also provide ratings for air leakage and movement capabilities. A common firestop system for joint applications that resembles the head-of-wall application at the Student Center is provided in Figure 8.22 below. Such a system should form the basis of design.

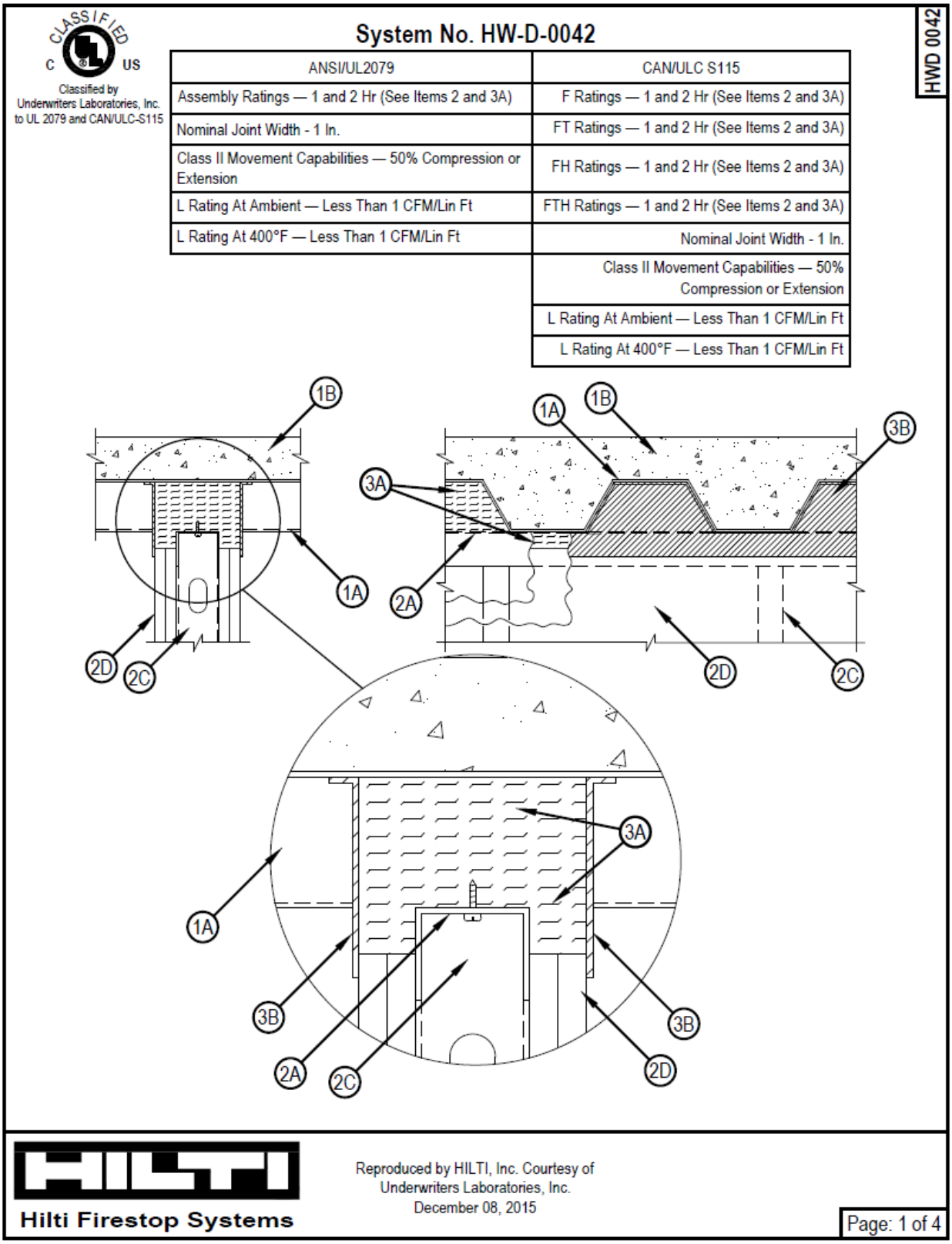

Figure 8.22: Common Head-of-Wall Firestop Joint (1 of 4)

HWD 0042

System No. HW-D-0042

1. Floor Assembly — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor And Form Units* — Max 3 in. (76 mm) deep galv steel fluted units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
   C. Spray-Applied Fire Resistive Materials* — (Optional, Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B, respectively) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (45 mm) thickness of fire resistive material.
   ISOLATEK INTERNATIONAL — Type 300
   W R GRACE & CO - CONN — Types MK-6-HY or MK-10HB
   1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Roof Insulation — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.
   1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.
   ISOLATEK INTERNATIONAL — Type 300
   W R GRACE & CO - CONN — Types MK-6-HY or MK-10HB
2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor And Ceiling Runners — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC before optional spray-applied fire resistive material is used. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — SDT250, SDT300
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   OLMAR SUPPLY INC — STT250, STT300
   R & P SUPPLY — SCT250, SCT300
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track

Figure 8.22: Common Head-of-Wall Firestop Joint (2 of 4)

System No. HW-D-0042

HWD 0042

A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — When the nom joint width is less than or equal to 3/4 in. (19 mm), vertical deflection ceiling runner may be used as an alternate to the ceiling runners in Items 2A and 2A1. Vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.

THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800

A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.

OLMAR SUPPLY INC — Type SCR

B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel masonry anchors, steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.

C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.

D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. and 1-1/4 in. (16 and 32 mm) on each side of wall for 1 and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck units and the top row of screws shall be installed into the studs 1-1/2 to 2 in. (38 to 51 mm) below the bottom of the ceiling runner. The hourly rating of the joint system is dependent on the hourly rating of the wall.

Figure 8.22: Common Head-of-Wall Firestop Joint (3 of 4)

System No. HW-D-0042

HWD 0042

3. Joint System — Max separation between bottom of floor or roof and top of wall at time of installation of joint system is 1 in. (13 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of forming material and a fill material, as follows:

A. Forming Material* — Nom 4 pcf (64 kg/m3) density mineral wool batt insulation cut with a length approx equal to the overall thickness of the wall. Multiple pieces stacked on top of each other, as needed, and then compressed 25 percent in thickness and inserted into the flutes of the steel deck above the top of the ceiling runner. The mineral wool batt insulation is to project beyond each side of the ceiling runner, flush with wall surfaces. Alternately, nom 4 pcf (64 kg/m3) forming material cut to shape of flute and nom 1 in. (25 mm) longer than thickness of wall; mineral wool compressed from ends and firmly packed into each flute to attain a min compression rate of 14.3 percent in the length (wall thickness) direction to be flush with both wall surfaces. Additional 5/8 in. and 1-1/4 in. (16 and 32 mm) wide strips for 1 and 2 hr rated assemblies, respectively, of nom 4 pcf (64 kg/m3) mineral wool batt insulation are to be cut to fill the gap between the top of the gypsum board and bottom of the steel deck. The strips of mineral wool are compressed 50 percent and tightly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel deck on both sides of the wall.

IIG MINWOOL L L C — MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO — Delta- Board

ROXUL INC — SAFE

THERMAFIBER INC — Type SAF

A1. Forming Material*—Plugs — (Optional, Not Shown) Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond each side of the ceiling runner, flush with wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel floor units.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs

A2. Forming Material* - Strips — (Optional) - Nom 5/8 in. and 1-1/4 in. (16 and 32 mm) wide by 2 in. (51 mm) high precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent and firmly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips

B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When Spray-Applied Fire Resistive Material* is applied to the Steel Floor and Form Units*, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the Spray-Applied Fire Resistive Material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the firestop joint spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-SP WB Firestop Joint Spray

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Figure 8.22: Common Head-of-Wall Firestop Joint (4 of 4)

To further enhance the treatment of the head-of-wall joints, an Engineering Judgment showing the specific conditions encountered at the Student Center should be obtained. Engineering Judgments have been identified by the International Firestop Council as acceptable alternatives to using listed firestop systems where no listed firestop systems match the jobsite conditions. The basis for such Engineering Judgments is contained IBC Appendix K105: Alternative Engineered Design.

Section K105.2 refers to alternative designs for fire resistance ratings and requires that manufacturer instructions be followed. Even though a fire resistance rating is not required for the fire barrier head-of-wall joints at the Student Center, an Engineering Judgment issued by the firestop manufacturer will provide reassurance that the firestop products are being used in an acceptable manner.

It should be noted that the fire barriers are formed from gypsum wall assemblies. Gypsum-to-gypsum corner joints can be protected with mud and tape. This is supported by the UL Guide Info. (Category BXUV) for fire resistance rated assemblies.

Summary

The performance based design analysis presented above has affirmed that the prescriptive requirements for fire and life safety systems at the Student Center are adequate to meet the goals of maintaining the life safety of occupants and providing a first step in ensuring structural integrity. This conclusion was reached using an FDS simulation informed by data on common fires, data regarding fires involving items of interest present at the Student Center, and by the performance based design guidance provided in the LCS and SFPE Handbook. Two fire scenarios, Design Fire Scenario 1 (Design Fire A) and Design Fire Scenario 6 (Design Fire B), as detailed in LSC Section 5.5.3.1 were evaluated.

The analysis of Design Fire A found that ASET (1 minute, 30 seconds) exceeds RSET (41 seconds). The ASET was established by the tenability criteria for visibility whereby the smoke layer reached a height of 1.8 meters at 90 seconds. The temperature in the doorway reached 60 °C by 123 seconds. Carbon monoxide exposure did not reach untenable levels during the simulation run time. Flashover conditions were not met because the maximum ceiling temperature was 220 °C and because the maximum heat flux to the floor was 0.24 kW/m^2. The first sprinkler activated at 107 seconds. The RSET was found by using a hydraulic model for occupant movement to find the time it would take for occupants in Room 505 to exit the room and clear the doorway. RSET was composed of an instant time to notification due to occupants being in the room of fire origin, a delay/pre-movement time of 30 seconds, a travel time of 4 seconds, and a 20% safety factor.

The analysis of Design Fire B found that ASET (8 minutes, 27 seconds) exceeds RSET (7 minutes, 12 seconds). ASET was established by visibility falling below 10 meters at 507 seconds. The temperature threshold was reached by 545 seconds. Exposure to CO did not reach the tenability limit. Flashover conditions were not met because the maximum ceiling temperature was 220 °C

and because the maximum heat flux to the floor was 0.45 kW/m^2. The first sprinkler activated at 120 seconds. RSET was established by calculating the time for a complete evacuation of the Student Center based on a hydraulic model. RSET was composed of a 120s time to notification, a 30 second delay/pre-movement time, a 3.5 minute travel time, and a 20% safety factor.

An approach for providing documentation for meeting the prescriptive requirements regarding fire barrier joints by using engineered judgments was presented.

Taft Community College

New Student Center Fire and Life Safety Analysis

Section 9: Summary of Report Findings, Concluding Remarks, and Recommendations

Summary of Report Findings

A summary of this fire and life safety report is provided below.

Section 1: Project Introduction

The new Student Center is intended to provide a place of recreation and activities for students, faculty, staff, and community members. It is located along two public ways: a county library to the north and a street to the east. The Student Center is also situated between dormitories to the South and a courtyard to the West. The Student Center is designed as a one-story building.

Section 2: Use and Occupancy Classification, Building Type, and Fire and Smoke Protection Features

The selection of Type II-B construction exceeds the IBC requirements given the size and layout of the Student Center. It also seems to have allowed the designers more flexibility in specifying an aesthetically pleasing and functional space. This analysis concludes that the requirements of the 2015 IBC in regards to structural fire protection features have been satisfied.

Section 3: Interior Finish and Flammability Assessment

Interior finishes will need to be monitored to ensure compliance with the basic prescriptive requirements, as discussed in Section 3, throughout the life of the Student Center. Moreover, if materials that can pose significant fire risk are used, the assessment of their impact on fire safety should go beyond the prescriptive requirements. It may be necessary to limit the use of materials that are otherwise acceptable to prescriptive requirements.

Section 4: Automatic Fire Sprinkler System

The fire sprinkler system designed for the Student Center is adequate based upon the system supply exceeding the expected demand. System supply is shown in Table 4.1 and Figure 4.3. Demand is calculated as being 535 gpm at a residual pressure of 46.1 psig. The supply was based upon fire hydrant flow testing that produced a static pressure of 62 psig, and residual pressure of 28 psig, and flow of 1540 gpm at the residual pressure. It will be necessary for the original designer to submit full calculations with regards to the fire sprinkler demand. It will also be necessary to re-verify the water supply requirements and include the results with the fire sprinkler design plan.

Significant figures and tables include:

- Figure 4.7: Fire Sprinkler System Components
- Table 4.3: Fire Sprinkler Hydraulic Calculations
- Figure 4.9: Fire Sprinkler Supply vs Demand

Section 5: Kitchen Fire Suppression System

The Ansul R-102 is a proprietary pre-engineered fire suppression system. Specific requirements for performing the installation and maintenance of such systems will be contained in the manufacturer's instructions. Only personnel qualified by the manufacturer should perform work on this system. The kitchen fire suppression system is connected to the fire alarm system so that building occupants will be notified upon system discharge.

Section 6: Fire Alarm System

Smoke detectors are not the primary means of automatic fire detection, but photoelectric type smoke detectors are planned for locations involving sensitive fire alarm equipment. Fire sprinklers are the primary means of detection as these devices are located throughout the Student Center. The integration of the fire sprinklers in to the fire alarm system is via a water flow switch installed on the sprinkler system riser which is connected to a monitor module installed on the fire alarm system. There is a similar connection between the fire alarm system and the kitchen fire suppression system. Duct smoke detectors are installed as a means of smoke control and are intended to limit the spread of combustion products via the HVAC system. Duct smoke detectors are connected to the fire alarm system.

Notification appliances are installed in the correct orientation and with the correct spacing throughout the Student Center. Power requirements for the fire alarm control panel and the two notification appliance circuit extender panels, with regards to a secondary power source, are satisfied by batteries, which calculations show are properly sized. Similarly, the voltage drop of these three devices when servicing all connected devices does not exceed acceptable limits.

Significant figures and tables include:

- Figure 6.2: Smoke Detector Layout
- Figure 6.8: Pull Station Layout
- Figure 6.9: Duct Detector Layout
- Figure 6.10: Notification Appliance Layout

Section 7: Egress System and Components

The Student Center meets the prescriptive requirements with regards to egress systems. The use of each area has been clearly identified. The flow of occupants in an evacuation scenario is clearly indicated on the design documents.

Significant figures and tables include:

- Table 7.1: Occupant Load Breakdown by Area
- Figure 7.2: Exit Analysis Floor Plan

Section 8: Performance Based Design

The performance based design analysis presented above has affirmed that the prescriptive requirements for fire and life safety systems at the Student Center are adequate to meet the goals of maintaining the life safety of occupants and providing a first step in ensuring structural integrity. This conclusion was reached using an FDS simulation informed by data on common fires, data regarding fires involving items of interest present at the Student Center, and by the performance based design guidance provided in the LCS and SFPE Handbook. Two fire scenarios, Design Fire Scenario 1 (Design Fire A) and Design Fire Scenario 6 (Design Fire B), as detailed in LSC Section 5.5.3.1 were evaluated.

The analysis of Design Fire A found that ASET (1 minute, 30 seconds) exceeds RSET (41 seconds). The ASET was established by the tenability criteria for visibility whereby the smoke layer reached a height of 1.8 meters at 90 seconds. The temperature in the doorway reached 60 °C by 123 seconds. Carbon monoxide exposure did not reach untenable levels during the simulation run time. Flashover conditions were not met because the maximum ceiling temperature was 220 °C and because the maximum heat flux to the floor was 0.24 kW/m^2. The first sprinkler activated at 107 seconds. The RSET was found by using a hydraulic model for occupant movement to find the time it would take for occupants in Room 505 to exit the room and clear the doorway. RSET was composed of an instant time to notification due to occupants being in the room of fire origin, a delay/pre-movement time of 30 seconds, a travel time of 4 seconds, and a 20% safety factor.

The analysis of Design Fire B found that ASET (8 minutes, 27 seconds) exceeds RSET (7 minutes, 12 seconds). ASET was established by visibility falling below 10 meters at 507 seconds. The temperature threshold was reached by 545 seconds. Exposure to CO did not reach the tenability limit. Flashover conditions were not met because the maximum ceiling temperature was 220 °C and because the maximum heat flux to the floor was 0.45 kW/m^2. The first sprinkler activated at 120 seconds. RSET was established by calculating the time for a complete evacuation of the Student Center based on a hydraulic model. RSET was composed of a 120s time to notification, a 30 second delay/pre-movement time, a 3.5 minute travel time, and a 20% safety factor.

An approach for providing documentation for meeting the prescriptive requirements regarding fire barrier joints by using engineered judgments was presented.

Concluding Remarks and Recommendations

From a prescriptive requirement standpoint, the proposed fire and life safety features of the Student Center are adequate. There is room for improvement with regards to the information conveyed by project documents. This section will consider those deficiencies that have been identified, administrative controls, and recommendations to help provide a sense for what steps can be taken to enhance confidence of the fire and life safety systems.

Deficiencies

Section 2: Use and Occupancy Classification, Building Type, Fire and Smoke Protection Features

1. More information needs to be provided in regards to the areas in the Student Center shown to have fire resistance rated construction. The design documents should explicitly indicate the reasons for this departure from the rest of the Student Center. The Boiler Room clearly fits into the IBC definition of incidental use, but the Electrical Room and ASB Storage have no clear reasons to use fire rated construction.

2. The need for firestop systems for penetrations and joints at fire barriers should be identified on the project documents so that the relevant trades can be aware of this requirement and plan appropriately.

Section 4: Automatic Fire Sprinkler System

1. Hydraulic calculations must be properly documented and placed with the fire sprinkler design documents.

Recommendations and Proposed Administrative Controls

1. There are some sections of IBC Chapter 10 that should be reviewed based upon the potential uses of the Student Center. Section 1003.6 requires that the means of egress shall not be interrupted by building elements or by obstructions. In the case of events at the Student Center, such as food sales or game marathons, controls should be put in place to ensure that the furnishings used by such events do not diminish the capacity of hallways or doors. It is also important to ensure that decorations do not obstruct the view of exit signage.

2. Repurposing an area within the Student Center can affect the total number of occupants in such a way that the number of exits would not be adequate for the increased occupant load. The area most susceptible to this would be the delivery area, which has a design occupant load of 3, ample space for additional individuals, and only one exit. In the case that this area is repurposed, the number of exits available must be taken into account to comply with the provisions of IBC Section 1006.2.1 and Table 1006.2.1.

3. The Northeast exit from the Bookstore should be increased in size and designed to match the entry/exit from the East Vestibule. This will help ensure that occupants entering the Bookstore are immediately aware of this alternative exit.

4. Redundancy should be added to the fire sprinkler flow switch to fire alarm monitor module interface. This will ensure that a single failure cannot disrupt the automatic notification of fire events to Student Center occupants.

References

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13. *Fire Dynamics Simulator (Version 6) Technical Reference Guide.* Washington: US Government Printing Office, 2013. Print.

14. *Fire Dynamics Simulator (Version 6) User Guide.* Washington: US Government Printing Office, 2013. Print.

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Appendix A: Fire Sprinkler Component Details

VIKING®

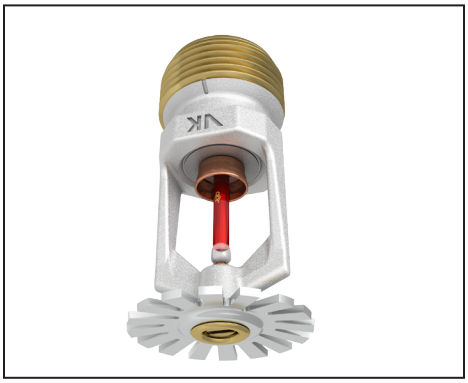
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester, Polytetrafluoroethelyne (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves ENT finish as corrosion resistant.** FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Class Series 2000

VdS Approved: Certificates G414019 and G414020

LPCB Approved

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0786-CPD-40279

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)
Rated to 175 psi (12 bar) water working pressure
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread size: 3/4" NPT, 20 mm BSP
Nominal K-Factor: 8.0 U.S. (115.2 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4" (58 mm)

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400
Deflector: Phosphor Bronze UNS-C51000 or Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Quick Response Upright and Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.
Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, Black PTFE = N, and ENT = JN
Temperature Suffix: 135 °F (68 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G
For example, sprinkler VK352 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 18258AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

A. Standard Wrench: Part No. 10896W/B (available since 2000).
B. Wrench for Recessed Pendent Sprinklers: Part No. 16036W/B** (available since 2011)
C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool*** Part No. 15915 (available since 2010)
**A ½" ratchet is required (not available from Viking).
***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:
A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

5. OPERATION
During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY
The Viking Microfast® Quick Response Pendent Sprinkler VK352 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE
For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

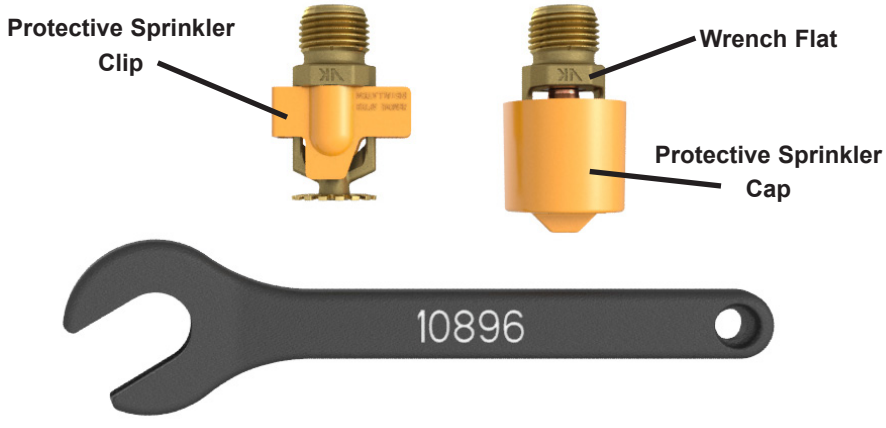


Figure 1: Standard Sprinkler Wrench 10896W/B

VIKING®

TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, Black PTFE, and ENT

Corrosion-Resistant Coatings[3]: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

[1] The sprinkler temperature rating is stamped on the deflector.

[2] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

[3] The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, PTFE, and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated

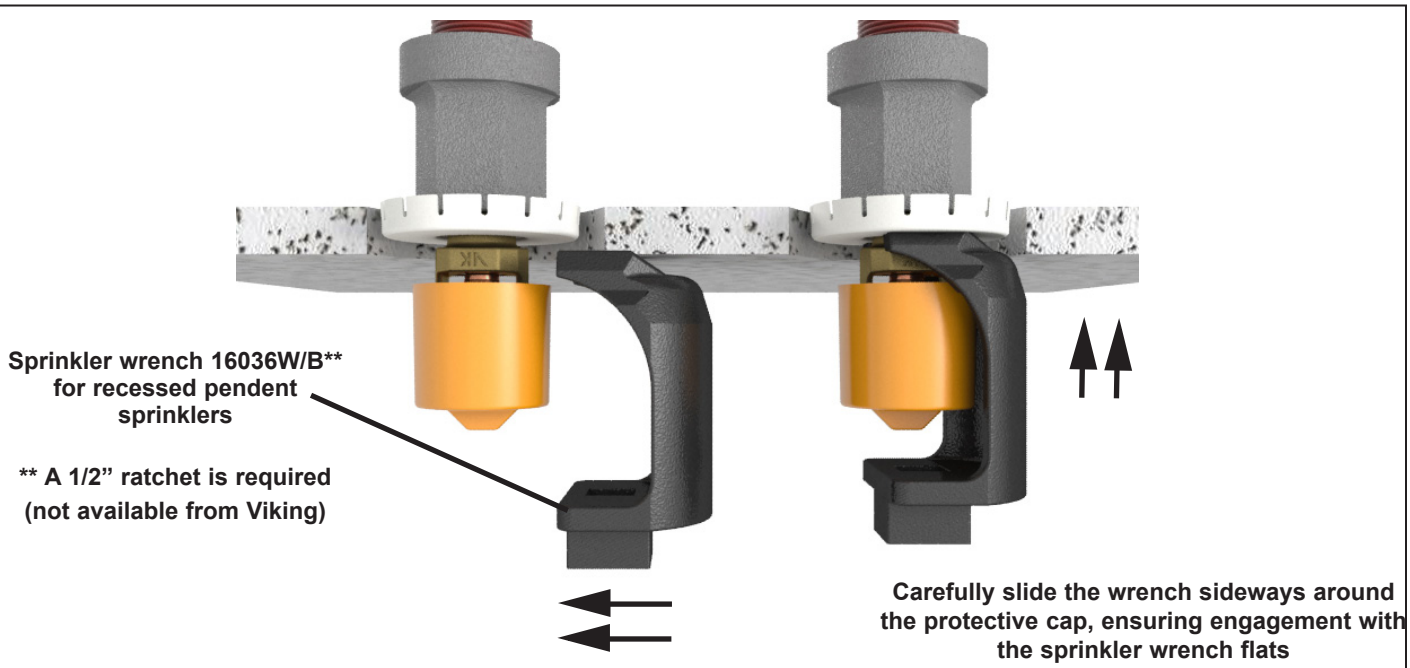


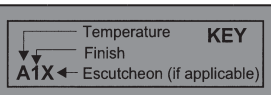
Figure 2: Wrench 16036W/B for Recessed Pendent Sprinklers

VIKING®	TECHNICAL DATA	MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

The Viking Microfast® Quick Response Pendent Sprinkler VK352
Maximum 175 PSI (12 Bar) WWP



Base Part Number[1]	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals[3] (Refer also to Design Criteria.)			
			NPT	BSP	U.S.	metric[2]	Inches	mm	cULus[4]	VdS	LPCB	CE
18258	VK352	Pendent	3/4”	20 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, C2X, D2	A3	A3Z	D3[8]
18260[7]	VK352	Pendent	1/2”	15 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, C2X, D2	A3	--	D3[9]

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[5,6], Black Polyester[5,6], and Black PTFE
2 - ENT[5]
3 - Brass, Chrome, White Polyester[5,6], and Black Polyester[5,6]

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon
Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

[1] Base part number shown. For complete part number, refer to Viking’s current price schedule.

[2] Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

[3] This table shows the listings and approvals available at the time of printing. Other approvals may be in process.

[4] Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.

[5] cULus Listed as corrosion-resistant.

[6] Other colors are available on request with the same Listings and Approvals as the standard colors.

[7] The 1/2” NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

[11] CE Certified, Standard EN 12259-1, EC-certificates of conformity 0832-CPD-2001.

[12] CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40279.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

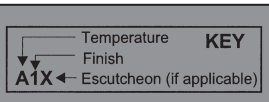
IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

VIKING®	TECHNICAL DATA	MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

The Viking Microfast® Quick Response Pendent Sprinkler VK352
Maximum 175 PSI (12 Bar) WWP



Base Part Number[1]	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[3] (Refer also to Design Criteria.)
			NPT	BSP	U.S.	metric[2]	Inches	mm	
18258	VK352	Pendent	3/4”	20 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, D2X, C2
18260[6]	VK352	Pendent	1/2”	15 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, D2X, C2

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester[4], and Black Polyester[4]
2 - ENT[5]

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon
Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

[1] Base part number shown. For complete part number, refer to Viking’s current price schedule.

[2] Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

[3] This table shows the FM Approvals available at the time of printing. Other approvals may be in process.

[4] Other colors are available on request with the same Approvals as the standard colors.

[5] FM approved as corrosion resistant.

[6] The 1/2” NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is FM Approved as quick response **Non-storage** upright and pendent sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

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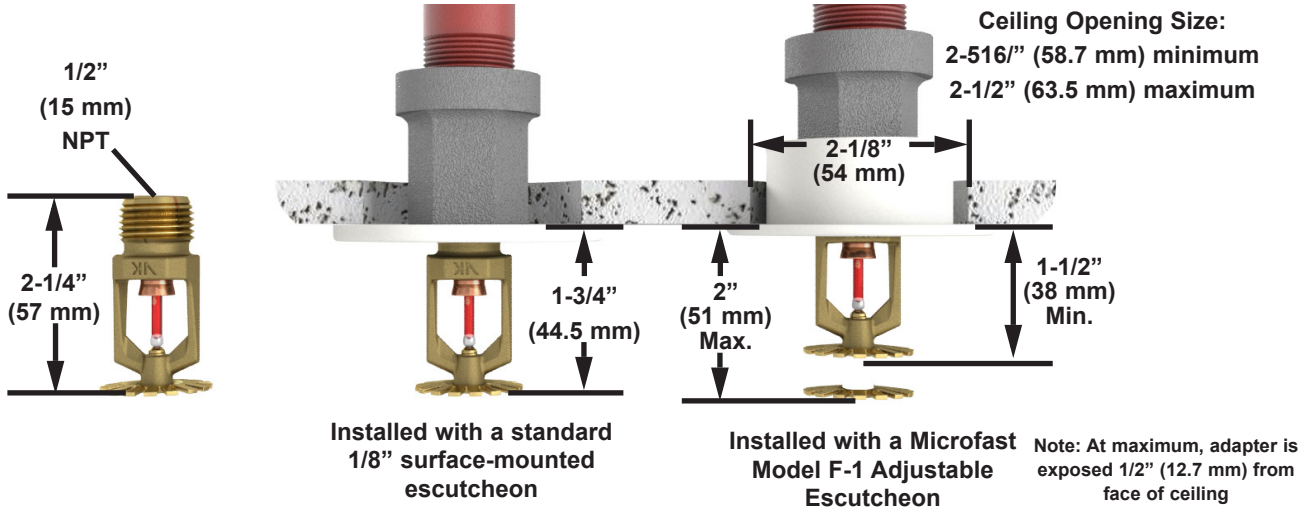


Figure 3: Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

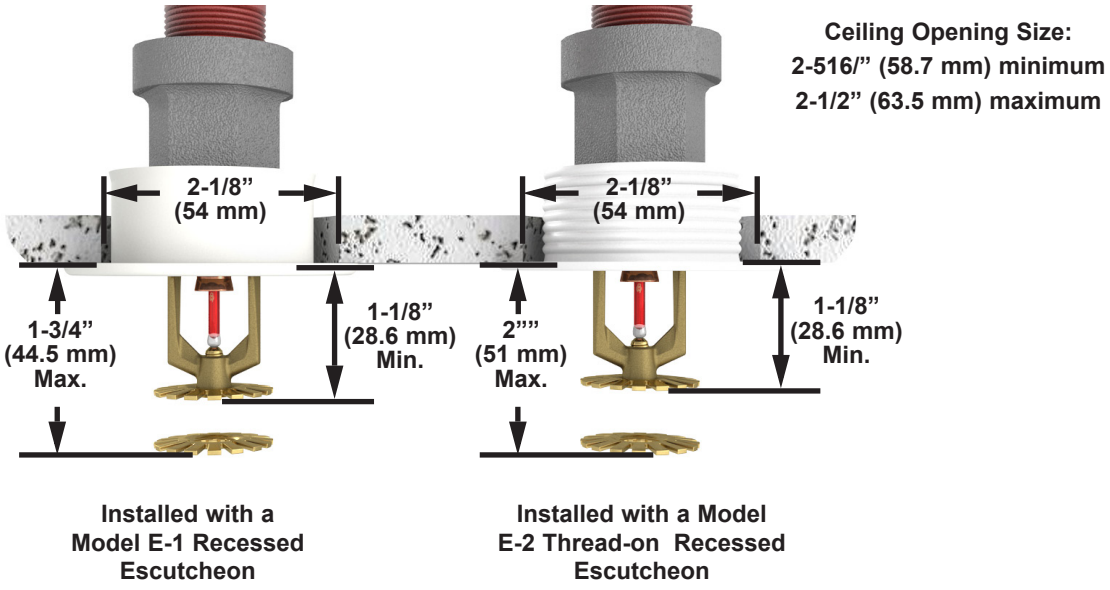


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons

PWPipe®

PVC C900 High Pressure Water Pipe

PWPipe

Waterworks Products

Tough, Reliable and Perfect for Municipal Water Systems

www.pwpipe.com

Why more specifiers choose PWPipe C900 for potable water systems.

PWPipe is the largest producer of PVC pipe in western North America and our products are available from distributors throughout this geographic region. Our water works products are distributed primarily in the states West of the Rockies.

PWPipe products include PVC and polyethylene pipe and tubing for a variety of applications servicing the potable water, well casing, sewer, turf, agriculture, plumbing, communications, and electrical markets. Our manufacturing facilities in Oregon, Washington, California, Utah, and Nebraska assure on-time delivery.

PWPipe C900 high pressure water pipe combines superior materials with the latest manufacturing technology.

PWPipe products meet or exceed industry standards because of our rigorous quality-control program.

PWPipe supports the PVC pipe industry's efforts to maintain the highest design and manufacturing standards. We are members of the Uni-Bell PVC Pipe Association and American Water Works Association (AWWA).

Corrosion Resistance
C900 is immune to nearly all types of internal and external corrosion. Since PVC is a non-conductor, it is not affected by electrolysis. Nor is it susceptible to alkaline or acid soil conditions. A correctly installed PWPipe system will provide long-term service at reduced operating costs.

Water Quality
Extractant water purity tests performed by independent test laboratories ensure that our pipe meets the requirements for water purity as specified by ANSI/NSF Standard 61.

Superior Flow Characteristics
An extremely smooth inner surface gives C900 a Hazen-Williams flow coefficient of C=150. This means less burden on pumps and reduced pumping costs, because there's less friction between moving water and pipe walls.

Exceptional Strength and Durability
Every piece of C900 is hydrostatically proof tested at four times its pressure class.

A 2.5-to-1 safety factor is applied to the long-term pressure capacity of the pipe. The resulting value is further reduced by a surge pressure value, which also incorporates a 2.5-to-1 safety factor. Burst test pressure capability of C900 Class 150 is at least 755 psi, with sustained pressure test capability of 500 psi.

Throughout the country, in all conditions and climates, C900 has served admirably in municipal water mains, fire lines, and sewage force mains.

Joint Integrity
PWPipe's integral bell gasketed joint meets the same strength requirements of the C900 pipe, as well as the demanding test criteria of ASTM D 3139. The ability of PVC to bend without breaking allows the joint and pipe assembly to compensate for minor earth movement, which can cause problems in more rigid, non-PVC assemblies.

Certification
C900 is periodically tested to maintain listings from Factory Mutual System* (FM) and Underwriters Laboratories (UL). C900 also conforms to applicable requirements of the Uniform Plumbing Code™.

*Factory Mutual is not applicable to Class 100, DR 25 products.

Uni-Bell PVC Pipe Association MEMBER

American Water Works Association MEMBER

FM

UL LISTED

ASTM

1. Clean all debris from the bell end of the pipe. Check the gasket position. Be sure it's completely seated in the groove, with no raised areas.

2. Lubricate the spigot end, using only the PWPipe recommended lubricant supplied with the pipe.

3. Place the pipes in straight alignment. Assemble to the insertion line on the spigot—**but no farther**.

See the PWPipe installation guide for more detailed instructions.

Basic Assembly Instructions


1.


2.


3.

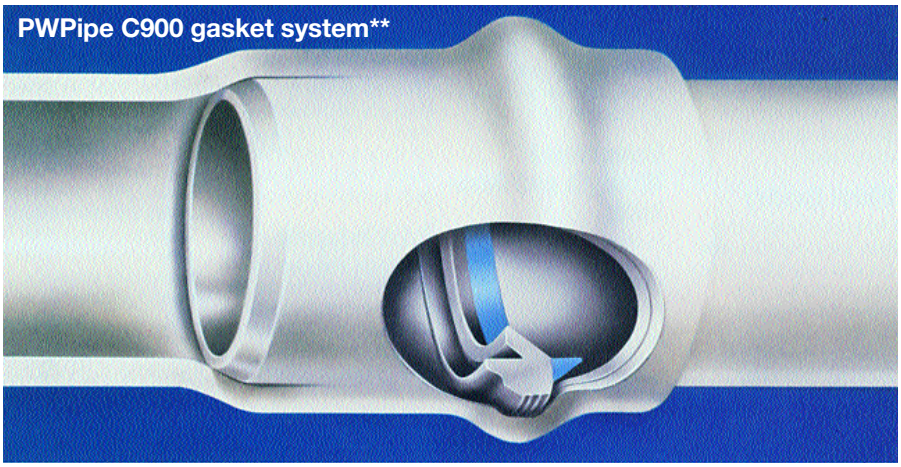
Factors Affecting Design

Hydraulics

C900's pipe wall is extremely smooth and energy-efficient. It has a Hazen-Williams coefficient of C=150.

Pressure Class

PWPipe offers a choice of three pressure classes (100, 150, and 200) which can be used where operating pressures do not exceed the pressure class plus surge allowances. When you have questions or encounter unusual circumstances, call a PWPipe representative.



Temperature

For operation at temperatures 80˚F or higher, multiply the pressure class by these derating factors:

Temperature	Derating Factor
80˚	0.88
90˚	0.75
100˚	0.62
110˚	0.50
120˚	0.40
140˚	0.22

Class 100 DR 25

Nominal Pipe Size (inches)	Average Outside Diameter (inches)	Approximate* Inside Diameter (inches)	Minimum Wall Thickness (inches)	Approximate Weight (lbs/100 ft)	Approximate Crate Weight (lbs)
4	4.80	4.39	0.192	190	1800
6	6.90	6.31	0.276	390	1400
8	9.05	8.28	0.362	670	2010
10	11.10	10.15	0.444	1020	1630
12	13.20	12.08	0.528	1440	1720/2300

Class 150 DR 18

Nominal Pipe Size (inches)	Average Outside Diameter (inches)	Approximate* Inside Diameter (inches)	Minimum Wall Thickness (inches)	Approximate Weight (lbs/100 ft)	Approximate Crate Weight (lbs)
4	4.80	4.23	0.267	260	2470
6	6.90	6.08	0.383	530	1920
8	9.05	7.98	0.503	920	2760
10	11.10	9.78	0.617	1390	2230
12	13.20	11.64	0.733	1970	2360/3150

Class 200 DR 14

Nominal Pipe Size (inches)	Average Outside Diameter (inches)	Approximate* Inside Diameter (inches)	Minimum Wall Thickness (inches)	Approximate Weight (lbs/100 ft)	Approximate Crate Weight (lbs)
4	4.80	4.07	0.343	330	3120
6	6.90	5.85	0.493	680	2430
8	9.05	7.67	0.646	1160	3490
10	11.10	9.41	0.793	1770	2830
12	13.20	11.19	0.943	2500	3000/4000

*These figures allow for manufacturing tolerances. **Gasket shown is for reference purposes only.

Product Description

Standard Specifications

Material
PVC compound meets ASTM D 1784, cell class 12454.

Pipe
Meets AWWA C900. Class 100 meets requirements of DR 25. Class 150 meets requirements of DR 18. Class 200 meets requirements of DR 14.

Elastromeric Seal
Integral bell pipe provided with factory-installed gaskets meeting requirements of ASTM F 477.

Gasketed Joint Assembly
Meets requirements of ASTM D 3139.

Installation
AWWA C605 and PWPipe's Installation Guide for PVC Water Pipe.

Product

C900 is suitable for use as a pressure conduit. Expansion and contraction are accommodated by a properly assembled gasketed joint. Each bell section meets the same pressure capacity requirements as the pipe.

Standard laying lengths are 20 feet (plus or minus 1 inch).

Quality Assurance

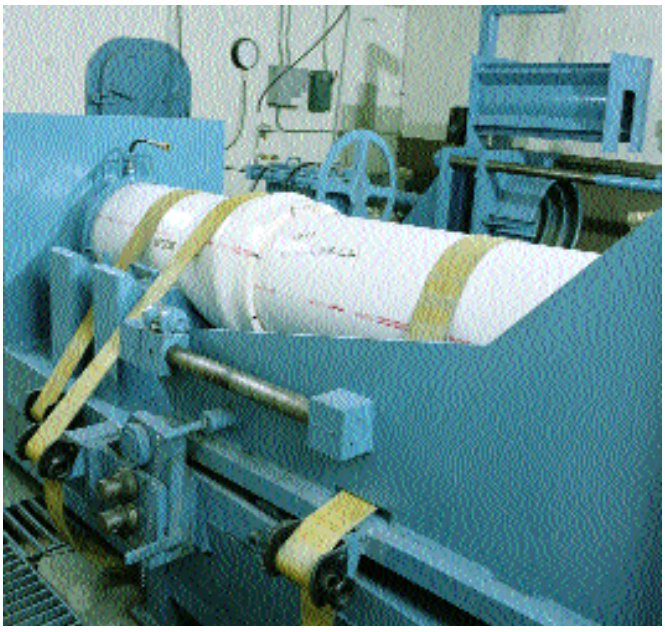
Hydrostatic Proof Testing
Each standard and random length of C900 is tested to four times the pressure class of the pipe, for a minimum of five seconds. The integral bell is tested with the pipe.

Falling Weight Impact Test
At 73°F, C900 withstands an impact energy of 150 ft-lbs, when tested in accordance with ASTM D 2444.

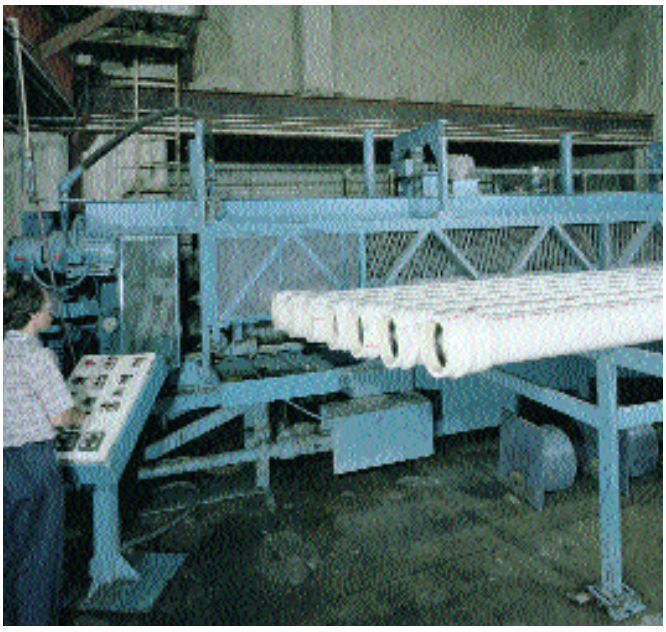
Quick Burst Test
Randomly selected C900 samples are tested in accordance with ASTM D 1599 to withstand pressures listed below. Class 100 has a minimum burst pressure of 535 psi; Class 150, a minimum burst pressure of 755 psi; Class 200, a minimum burst pressure of 985 psi.

Pipe Stiffness
C900 meets these minimum stiffness requirements:

Pressure Class	DR	Pipe Stiffness (psi)
100	25	129
150	18	364
200	14	814



JOINT INTEGRITY



HYDROSTATIC PROOF TEST

Installation

Pipe Embedment

All PVC pipe should be installed with bedding that provides uniform longitudinal support under the pipe. Use embedment material that is free of large stones, frozen matter, or other debris. Use proper compaction procedures to provide soil densities as specified by the design engineer.

Service Connections

Direct Tapping: Direct taps may be made in C900 Class 150 and Class 200 in nominal sizes 6 inch through 12 inch. Corporation stops should be in sizes ⅝, ¾, or 1 inch. When sizes larger than 1 inch are required, tapping saddles or sleeves should be used.

Saddle Tapping: Saddle taps may be made in any size or class of C900 pipe. Maximum outlet size recommended for saddle taps is 2 inches. For sizes larger than 2 inches, a tapping sleeve should be used.

Tapping Sleeves: Tapping sleeves may be used on all sizes and classes of C900. Sleeves are available up to size-on-size.

Caution: Saddles and sleeves should **not**:

- Distort the pipe when tightened
- Have lugs that dig into the pipe when the bolts are tightened
- Have a clamping arrangement not fully contoured to the outside diameter of the pipe

For more information on tapping, see Uni-Bell's tapping video and publications Uni-B-8 and Uni-Pub-8.

Table 1. Thrust Developed per 100 psi Pressure
AWWA C900 PVC Pressure Pipe (C.I.O.D.)

Nominal Pipe Size (inches)	Fitting 90° Elbow (lbs force)	Fitting 45° Elbow (lbs force)	Valves, Tees, Dead Ends (lbs force)
4	2,160	1,180	1,530
6	4,460	2,420	3,160
8	7,700	4,160	5,440
10	11,600	6,260	8,190
12	16,400	8,880	11,600

Table 2. Estimated Soil Bearing Capacity

Soil Type	Allowable Bearing Pressure (psf)
Muck, Peat, Etc.	0
Soft Clay	500
Sand	1,000
Sand and Gravel	1,500
Sand and Gravel With Clay	2,000
Sand and Gravel Cemented With Clay	4,000
Hard Pan	5,000

Note: Values are estimated for horizontal thrusts at depths of burial which exceed 2 feet.

Note: These values should be used only for estimating purposes. Values for design should be determined by an engineer familiar with site soil conditions.

Longitudinal Bending

Axial deflection at the pipe joints is not recommended, However, it is possible to curve C900 to allow for slight changes in direction.

Bending to these minimum radii will not jeopardize C900's design capability. See PWPipe's Technical Bulletin "Longitudinal Bending of PVC Pipe" for more details.

Nominal Pipe Size (inches)	Minimum Bending Radius (feet)
4	100
6	145
8	190
10	235
12	275

Thrust Restraint

Adequate thrust restraint is necessary for all gasketed joint systems. The “push on” features of our joints provide many installation advantages, but without adequate thrust restraint they can become “push off” problems. The large thrust forces present in water-distribution systems (see Table 1) require thrust restraints designed to handle test and peak operating pressures.

Concrete Thrust Blocks
If concrete thrust blocks are used, the size and type of thrust blocking must be based on the load-bearing capacity of the soil, pressure in the pipe, and diameter of the pipe. Table 2 provides conservative estimates of load-bearing values for various soil types. When soil conditions are not known, samples should be tested to determine soil properties.

Mechanical Restraints
If mechanical thrust restraint devices are used, they should be a type designed for use with PVC pipe. The devices should meet the test requirements of Uni-Bell’s Specification Uni-B-13 “Joint Restraint Devices for Use with PVC Pipe.” Design manuals and computer software are available from the restraint manufacturers.

For typical thrust blocking and mechanical thrust restraint examples, see Figures 1 through 6.

THRUST BLOCKS

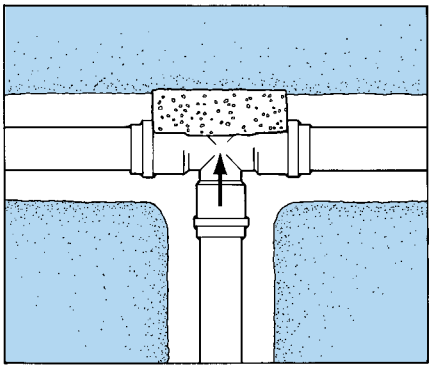


FIGURE 1: Through line connection, tee

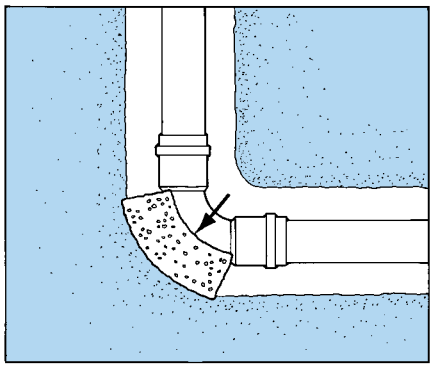


FIGURE 2: Direction change, elbow

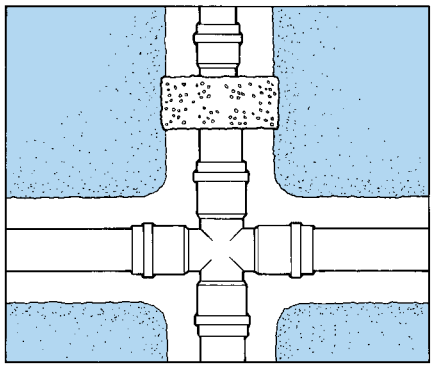


FIGURE 3: Change line size, reducer

MECHANICAL THRUST RESTRAINT DEVICES

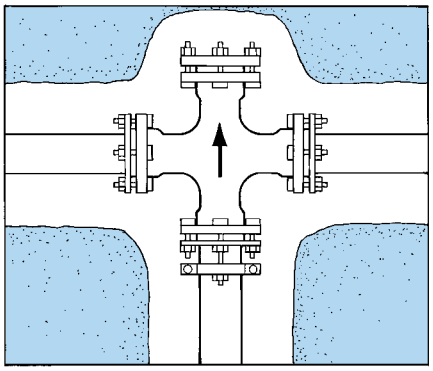


FIGURE 4: Through line connection, cross used as tee

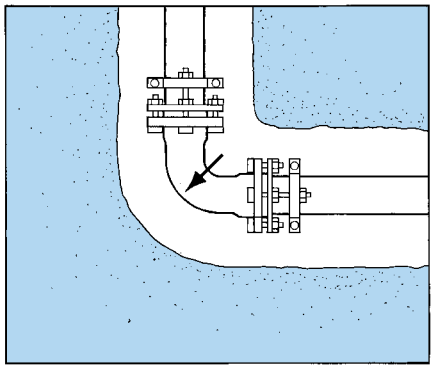


FIGURE 5: Direction change, elbow

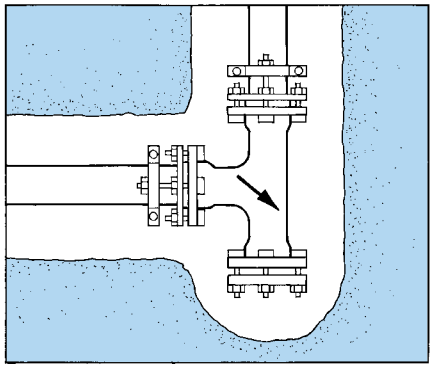


FIGURE 6: Direction change, tee used as elbow

Testing of Installed Systems

Place sufficient backfill before pipe filling and field testing. Under conditions requiring immediate backfilling of trenches, test after backfilling but prior to placement of permanent surface. Testing short lengths of pipe first will verify proper installation and joint assembly. If concrete thrust blocks are required, allow sufficient curing before testing.

Separate tests for pressure and leakage may be performed. If separate tests are done, the pressure test should be done first. See Table 4.

Procedure

While the line is under pressure, check for leaks in all exposed pipe, fittings, valves, and hydrants. Repair or replace all defective elements. Repeat the test until all visible leaks stop and the allowable leakage requirements are met, per Table 5. For detailed pressure-testing requirements, consult your engineer or the PWPipe installation guide.

WARNING: Do not use PVC pipe for pressurized air systems. Injury or death may result due to the catastrophic nature of pipe failure should failure occur. Rapid expansion of compressed air could propel shards of plastic throughout the area.

WARNING: Expel all air from the pipeline during filling and again before testing for pressure or leaks. Automatic air-release valves are recommended. Compressed entrapped air can greatly amplify surges or pumping pressures. Also, compressed air might leak through a joint that will not leak water.

Table 3. Volume of Water Required for Testing

Nominal Pipe Size (inches)	Volume (U.S. gal/100 ft)
4	70
6	153
8	259
10	405
12	573

Table 4. System Test Methods

Procedure	Pressure	Test Duration
Simultaneous pressure and leakage tests	150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation*	2 hr
Separate pressure test	150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation*	1 hr
Separate leakage test	150% of working pressure of segment tested*	2 hr

Source: Underground Installation of PVC Pressure Pipe and Fittings for Water, AWWA C605.

*Under no circumstances should test pressures exceed 305 psi for DR 14, 235 psi for DR 18, and 165 psi for DR 25 C900 PVC pipe.

Table 5. Allowable Leakage per 50 Joints
U.S. Gallons per Hour

Nominal Pipe Size (inches)	Average Test Pressure (psi) 50	100	150	200	250	300
4	0.19	0.27	0.33	0.38	0.43	0.47
6	0.29	0.41	0.50	0.57	0.64	0.70
8	0.38	0.54	0.66	0.76	0.85	0.94
10	0.48	0.68	0.83	0.96	1.07	1.17
12	0.57	0.81	0.99	1.15	1.28	1.40

PWPipe P.O. Box 10049, Eugene, OR 97440 • (800) 347-0200 • (541) 343-0200 • FAX (541) 686-9247 • www.pwpipe.com

OSY2
Supervisory Switch

The System Sensor OSY2 is used to monitor the open position of an Outside Screw and Yoke (OS&Y) type gate valve.

Features

- NEMA 3R-rated enclosure
- User-friendly mounting bracket fits newer valve yokes
- Single side conduit entry does not require right angle fittings
- Adjustable length actuator eliminates the need for cutting the shaft
- Accommodates up to 12 AWG wire
- Three position switch monitors vandal and valve close signals
- Two SPDT contacts are enclosed in a durable terminal block for added strength
- 100 percent synchronization activates both alarm panel and local bell simultaneously

Robust Construction. The OSY2 consists of a rugged housing, intended for indoor and outdoor use. When installed with the actuator in the vertical position, the OSY2 is NEMA 3R rated per UL.

Application Flexibility. The OSY2 features a user-friendly mounting bracket and adjustable shaft to permit mounting to most OS&Y valves, ranging in size from 1″ to 12″. Its right angle design and wide bracket span provides maximum clearance for valve components, to accommodate troublesome valves. Removing the OSY2's gate valve bracket allows the unit to monitor side-bracket-style pressure reducing valves.

Simplified Operation. Installation is made easier with the OSY2's single side conduit entrance. By providing a direct conduit pathway to the electrical source, right angle fittings are not required. Installation is further simplified by the OSY2's adjustable length actuator, which eliminates the need for cutting the shaft.

Reliable Performance. The OSY2 is equipped with tamper-resistant cover screws to prevent unauthorized entry. Inside, two sets of SPDT (Form C) synchronized switches are enclosed in a durable terminal block to assure reliable performance.

Agency Listings

S739 CS169 OW6A8.AY 167–93–E 7770-1653:118

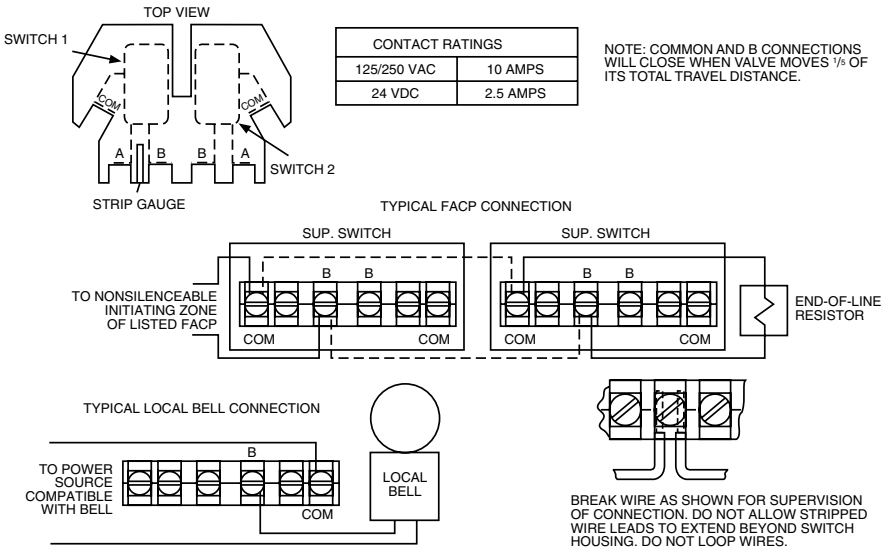
OSY2 Specifications

Architectural/Engineering Specifications

Model shall be model number OSY2 supervisory switch as manufactured by System Sensor. OSY2 shall be installed on each valve as designated on the drawings and/or as specified herein. Switches shall be mounted so as not to interfere with the normal operation of the valve and shall be adjusted to operate within two revolutions of the valve control or when the stem has moved no more than one-fifth of the distance from its normal position. The mechanism shall be contained in a weatherproof die cast metal housing that provides a side entrance for ½˝ conduit and incorporates the necessary facilities for attachment to the valve. A grounding provision is provided. The switch assembly shall include two switches each with a rated capacity of 10 Amp @ 125/250VAC and 2.5 Amp @ 24VDC. The cover shall contain tamper-resistant screws for which a security wrench will be provided with each switch. The OSY2 shall be Underwriters Laboratories listed for indoor or outdoor use. The OSY2 shall be Factory Mutual, CSFM, and MEA approved.

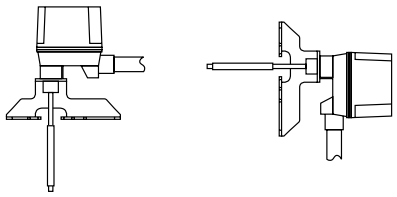
Physical Specifications		Operating Specifications	
Overall Switch Dimensions	5¾˝H x 3½˝W x 3¼˝D (14.6cm x 8.9cm x 8.2cm)	**Contact Ratings**	Two sets of SPDT (Form C) 10.0 A @ 125/250VAC; 2.5 @ 6/12/24VDC
Shipping Weight	2.8 lbs. (1.3 kg)	**Enclosure Rating**	UL indoor/outdoor NEMA 3R when mounted with the actuator vertical
Operating Temperature Range	32°F to 120°F (0°C to 49°C) NOTE: The OSY2 will operate from –40°F to 120°F (–40°C to 49°C); however UL does not test control valve supervisory switches below 32°F (0°C).	**Cover Tamper Switch**	Standard with ULC model Optional for UL model, part no. 546-7000
Maximum Stem Extension	2⅝˝ (6.7cm)	**Service Use**	Automatic Sprinkler: NFPA 13 One or Two Family Dwelling: NFPA 13D Residential Occupancies up to 4 stories: NFPA 13R National Fire Alarm code: NFPA 72
Bracket Span	¼˝H x 6¾˝W x 1˝D (5.7cm x 17.1cm x 2.5cm)	**Warranty**	3 years
Conduit Entrances	One single side open for ½˝ conduit	**U.S. Patent Nos.**	5,478,038; 5,213,205

Electrical Connections for OSY2



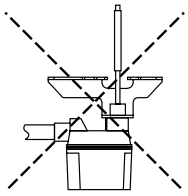
OSY2 Mounting

The following are examples of acceptable mounting positions:



Actuator Vertical (Down) Actuator Horizontal

The following mounting position is <u>not acceptable:</u>



Actuator Vertical (Pointing Up)

Ordering Information

Part No.	Description
OSY2	Outside Screw and Yoke valve supervisory switch
OSY2A	Outside Screw and Yoke valve supervisory switch (ULC model)

Accessories

OSYRK	Replacement hardware kit (wrenches, screw pack and J–hooks)	WFDW	Replacement tamper-proof wrench for cover
546-7000	Cover tamper switch kit	HEXW	Replacement hex wrench
S07-66-XX	Tamper screws for cover		

SYSTEM SENSOR®

3825 Ohio Avenue • St. Charles, IL 60174
Phone: 800-SENSOR2 • Fax: 630-377-6495

A05-0196-010 • 1/09 • #1960

VSR
VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD

UL, CUL and CSFM Listed, FM Approved, LPCB Approved, For CE Marked (EN12259-5) / VdS Approved model use VSR-EU

Service Pressure: 450 PSI (31 BAR) - UL

Flow Sensitivity Range for Signal:
4-10 GPM (15-38 LPM) - UL

Maximum Surge: 18 FPS (5.5 m/s)

Contact Ratings: Two sets of SPDT (Form C)
10.0 Amps at 125/250VAC
2.0 Amps at 30VDC Resistive
10 mAmps min. at 24VDC

Conduit Entrances: Two knockouts provided for 1/2" conduit. Individual switch compartments suitable for dissimilar voltages.

Environmental Specifications:

- NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket and die-cast housing when used with appropriate conduit fitting.
- Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL
- Non-corrosive sleeve factory installed in saddle.

Service Use:

Automatic Sprinkler	NFPA-13
One or two family dwelling	NFPA-13D
Residential occupancy up to four stories	NFPA-13R
National Fire Alarm Code	NFPA-72

Specifications subject to change without notice.

Ordering Information			
Nominal Pipe Size		Model	Part Number
2"	DN50	VSR-2	1144402
2 1/2"	DN65	VSR-2 1/2	1144425
3"	DN80	VSR-3	1144403
3 1/2"	-	VSR-3 1/2	1144435
4"	DN100	VSR-4	1144404
5"	-	VSR-5	1144405
6"	DN150	VSR-6	1144406
8"	DN200	VSR-8	1144408

Optional: Cover Tamper Switch Kit, stock no. 0090148
Replaceable Components: Retard/Switch Assembly, stock no. 1029030

⚠ WARNING

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Shock hazard. Disconnect power source before servicing. Serious injury or death could result.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.

CAUTION

Waterflow switches that are monitoring wet pipe sprinkler systems shall not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems. Waterflow switches used for this application may result in unintended discharges caused by surges, trapped air, or short retard times.

Important: This document contains important information on the installation and operation of the VSR waterflow switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

General Information

The Model VSR is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed for use on a steel pipe; schedules 5 through 40, sizes 2" - 6" and is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, sizes 2" thru 8" (50 mm thru 200 mm). LPC approved sizes are 2" thru 8" (50 mm thru 200 mm). See Ordering Information chart.

The VSR may also be used as a sectional waterflow detector on large systems. The VSR contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

Enclosure

The VSR switches and retard device are enclosed in a general purpose, die-cast housing. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

VSR
VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD

Installation (see Fig. 1)

These devices may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The device should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain.

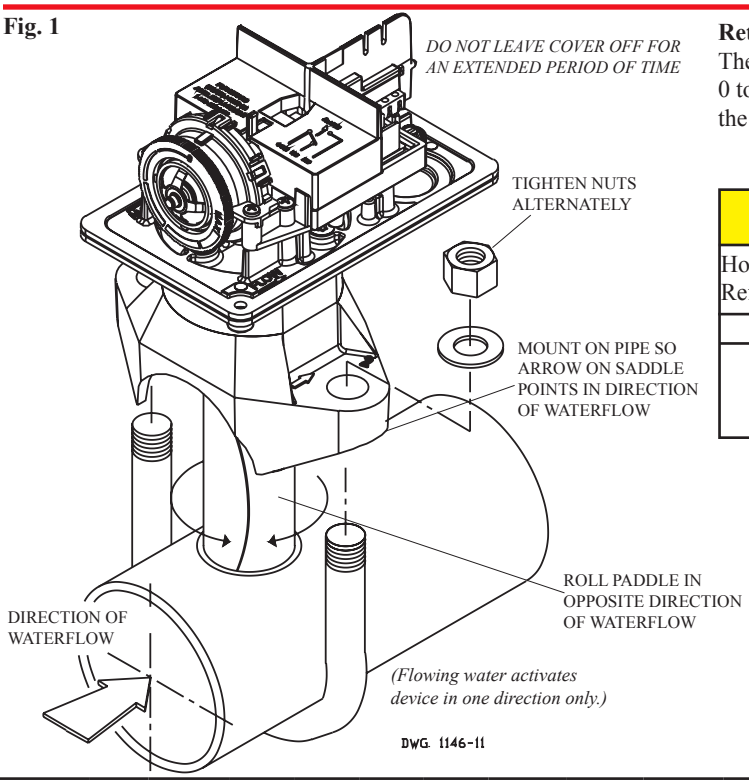
NOTE: Do not leave cover off for an extended period of time.

Drain the system and drill a hole in the pipe using a hole saw in a slow speed drill (see Fig. 1). Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole. Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Take care not to damage the non-corrosive bushing in the saddle. The bushing should fit inside the hole in the pipe. Install the saddle strap and tighten nuts alternately to required torque (see the chart in Fig. 1). The vane must not rub the inside of the pipe or bind in any way.

⚠ CAUTION

Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty. Do not obstruct or otherwise prevent the trip stem of the flow switch from moving when water flows as this could damage the flow switch and prevent an alarm. If an alarm is not desired, a qualified technician should disable the alarm system.

Fig. 1

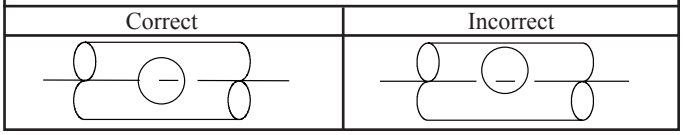


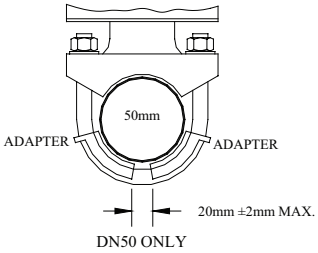
Retard Adjustment

The delay can be adjusted by rotating the retard adjustment knob from 0 to the max setting (60-90 seconds). The time delay should be set at the minimum required to prevent false alarms

CAUTION

Hole must be drilled perpendicular to the pipe and vertically centered. Refer to the Compatible Pipe/Installation Requirements chart for size.





USE (2) 5180162 ADAPTERS AS SHOWN ABOVE

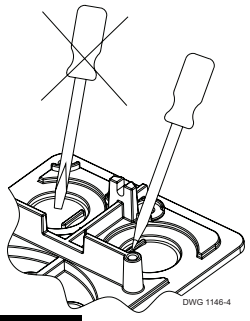
DWG# 1146-1F

Compatible Pipe/ Installation Requirements

Model	Nominal Pipe Size		Nominal Pipe O.D.		Pipe Wall Thickness										Hole Size		U-Bolt Nuts Torque	
					Lightwall		Schedule 10 (UL)		Schedule 40 (UL)		BS-1387 (LPC)		DN (VDS)					
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	ft-lb	n-m
VSR-2	2	DN50	2.375	60.3	.065	1.651	0.109	2.77	0.154	3.91	0.142	3.6	0.091	2.3	1.25 + .125/- .062	33.0 ± 2.0	20	27
VSR-2 1/2	2.5	-	2.875	73.0	.084	2.134	0.120	3.05	0.203	5.16	-	-	-	-				
VSR-2 1/2	-	DN65	3.000	76.1	-	-	-	-	-	-	0.142	3.6	0.102	2.6				
VSR-3	3	DN80	3.500	88.9	.083	2.108	0.120	3.05	0.216	5.49	0.157	4.0	0.114	2.9	2.00 ± .125	50.8 ± 2.0		
VSR-3 1/2	3.5	-	4.000	101.6	-	-	0.120	3.05	0.226	5.74	-	-	-	-				
VSR-4	4	DN100	4.500	114.3	.084	2.134	0.120	3.05	0.237	6.02	0.177	4.5	0.126	3.2				
VSR-5	5	-	5.563	141.3	-	-	0.134	3.40	0.258	6.55	-	-	-	-				
VSR-6	6	DN150	6.625	168.3	.115	2.921	0.134	3.40	0.280	7.11	0.197	5.0	0.157	4.0				
VSR-8	8	DN200	8.625	219.1	-	-	0.148	3.76	0.322	8.18	0.248	6.3	0.177	4.5				

NOTE: For copper or plastic pipe use Model VSR-CF.

Fig. 2
To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



NOTICE
Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

Fig. 3
Break out thin section of cover when wiring both switches from one conduit entrance.

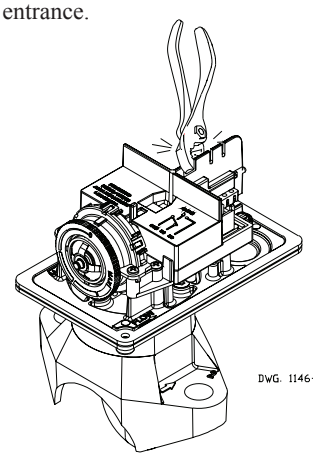
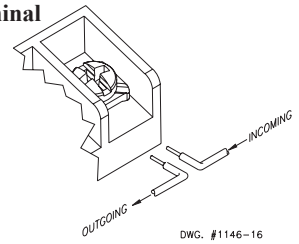


Fig. 4 Switch Terminal Connections Clamping Plate Terminal

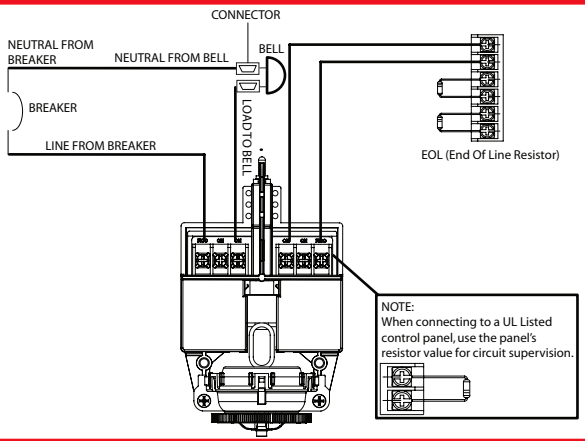


⚠ WARNING

An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life.

Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

Fig. 5 Typical Electrical Connections



Notes:

1. The Model VSR has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.
2. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 4).

Testing

The frequency of inspection and testing for the Model VSR and its associated protective monitoring system shall be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR is not recommended or advisable.
A minimum flow of 10 GPM (38 LPM) is required to activate this device.

NOTICE Advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

Fig. 6 Mounting Dimensions

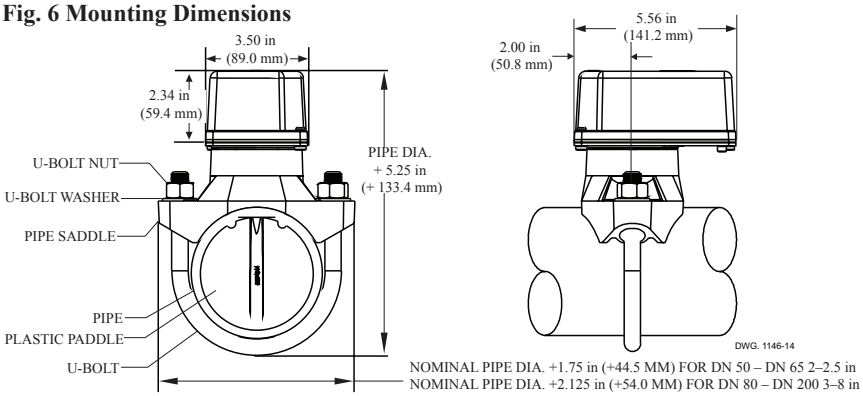
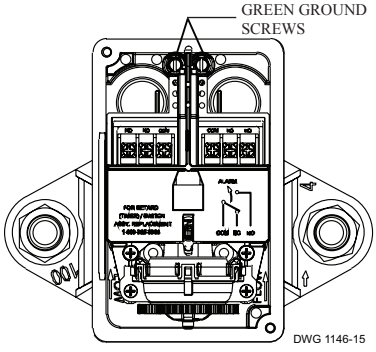


Fig. 7



Maintenance

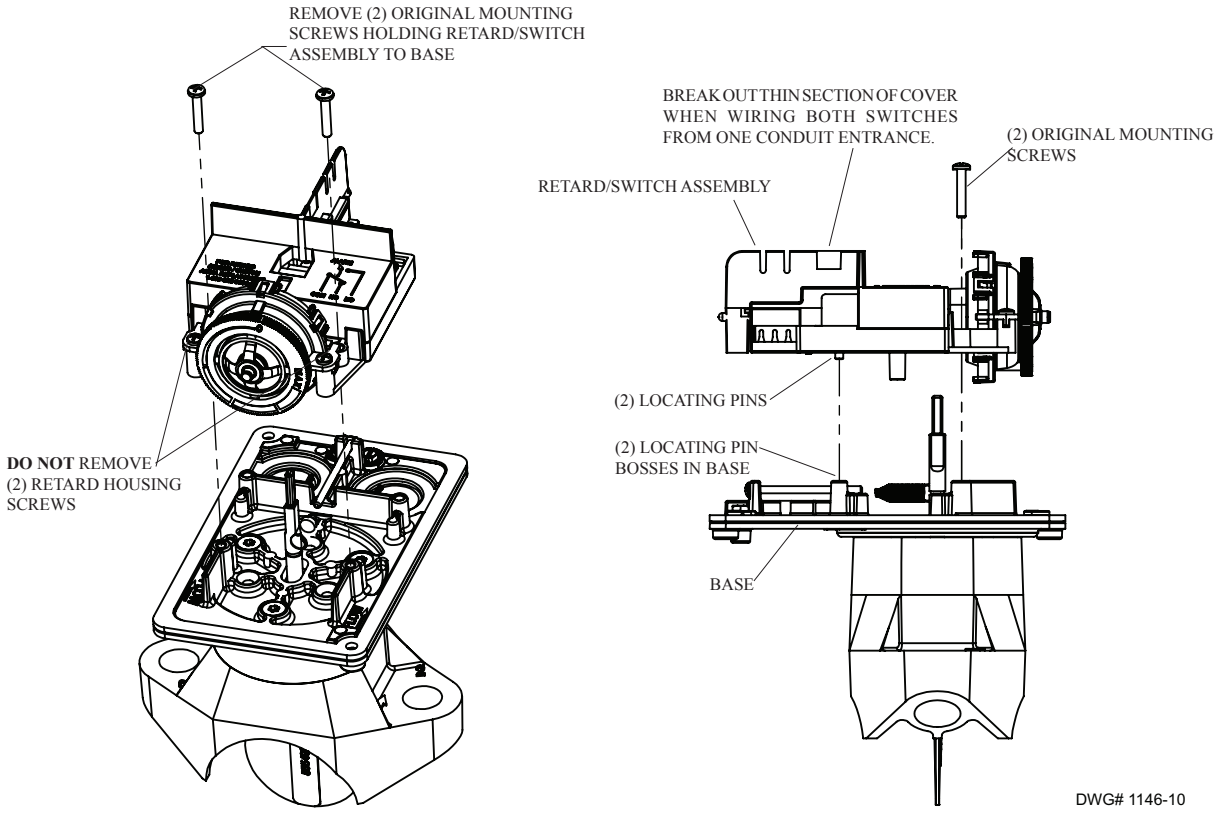
Inspect detectors monthly. If leaks are found, replace the detector. The VSR waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 8). There is no maintenance required, only periodic testing and inspection.

Retard/Switch Assembly Replacement (See Fig. 8)

NOTICE The Retard/Switch Assembly is field-replaceable without draining the system or removing the waterflow switch from the pipe

1. Make sure the fire alarm zone or circuit connected to the waterflow switch is bypassed or otherwise taken out of service.
2. Disconnect the power source for local bell (if applicable).
3. Identify and remove all wires from the waterflow switch.
4. Remove the (2) mounting screws holding retard/switch assembly to the base. **Do not** remove the (2) retard housing screws.
5. Remove the retard assembly by lifting it straight up over the tripstem.
6. Install the new retard assembly. Make sure the locating pins on the retard/switch assembly fit into the locating pin bosses on the base.
7. Re-install the (2) original mounting screws.
8. Reconnect all wires. Perform a flow test and place the system back in service.

Fig. 8



Removal of Waterflow Switch

- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Loosen nuts and remove U-bolts.
- Gently lift the saddle far enough to get your fingers under it. With your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
- Lift detector clear of pipe.

Appendix B: Fire Alarm System Component Details

NFS2-640(E)

Intelligent Addressable Fire Alarm System

NOTIFIER® by Honeywell

Intelligent Fire Alarm Control Panels

General

The NFS2-640 intelligent Fire Alarm Control Panel is part of the ONYX® Series of Fire Alarm Controls from NOTIFIER.

In stand-alone or network configurations, ONYX Series products meet virtually every application requirement.

The NFS2-640's modular design makes system planning easier. The panel can be configured with just a few devices for small building applications, or networked with many devices to protect a large campus or a high-rise office block. Simply add additional peripheral equipment to suit the application.

A host of other options are available, including single- or multi-channel voice; firefighter's telephone; LED, LCD, or PC-based graphic annunciators; networking; advanced detection products for challenging environments; wireless fire protection; and many additional options.

NOTE: *Unless called out with a version-specific "E" at the end of the part number, "NFS2-640" refers to models NFS2-640 and NFS2-640E; similarly, "CPU2-640" refers to models CPU2-640 and CPU2-640E.*

NFS2-640-DVC_right.jpg

NFS2-640

Features

- Certified for seismic applications when used with the appropriate seismic mounting kit.
- Approved for Marine applications when used with listed compatible equipment. *See DN-60688.*
- One, expandable to two, isolated intelligent Signaling Line Circuit (SLC) Style 4, 6 or 7.
- Wireless fire protection using SWIFT Smart Wireless Integrated Fire Technology. See DN-60820.
- Up to 159 detectors and 159 modules per SLC; 318 devices per loop/636 per FACP or network node.
  - Detectors can be any mix of ion, photo, thermal, or multi-sensor; wireless detectors are available for use with the FWSG.
  - Modules include addressable pull stations, normally open contact devices, two-wire smoke detectors, notification, or relay; wireless modules are available for use with the FWSG.
- Standard 80-character display, 640-character large display (NCA-2), or display-less (a node on a network).
- Network options:
  - High-speed network for up to 200 nodes (NFS2-3030, NFS2-640, NFS-320(C), NFS-320SYS, NCA-2, DVC-EM, ONYXWorks, NFS-3030, NFS-640, and NCA).
  - Standard network for up to 103 nodes (NFS2-3030, NFS2-640, NFS-320(C), NFS-320SYS, NCA-2, DVC-EM, ONYXWorks, NCS, NFS-3030, NFS-640, NCA, AFP-200, AFP-300/400, AFP-1010, and AM2020). Up to 54 nodes when DVC-EM is used in network paging.
- 6.0 A switch mode power supply with four Class A/B built-in Notification Appliance Circuits (NAC). Selectable System Sensor, Wheelock, or Gentex strobe synchronization.
- Built-in Alarm, Trouble, Security, and Supervisory relays.
- VeriFire® Tools online or offline programming utility. Upload/Download, save, store, check, compare, and simulate panel databases. Upgrade panel firmware.
- Autoprogramming and Walk Test reports.
- Multiple central station communication options:
  - Standard UDACT
  - Internet
  - Internet/GSM
- 80-character remote annunciators (up to 32).
- EIA-485 annunciators, including custom graphics.
- Printer interface (80-column and 40-column printers).
- History file with 800-event capacity in nonvolatile memory, plus separate 200-event alarm-only file.
- Alarm Verification selection per point, with automatic counter.
- Presignal/Positive Alarm Sequence (PAS).
- Silence inhibit and Auto Silence timer options.
- March time/temporal/California two-stage coding/strobe synchronization.
- Field-programmable on panel or on PC, with VeriFire Tools program check, compare, simulate.
- Full QWERTY keypad.
- Battery charger supports 18 – 200 AH batteries.
- Non-alarm points for lower priority functions.
- Remote ACK/Signal Silence/System Reset/Drill via monitor modules.
- Automatic time control functions, with holiday exceptions.
- Surface Mount Technology (SMT) electronics.
- Extensive, built-in transient protection.
- Powerful Boolean logic equations.
- Support for SCS Series smoke control system in HVAC mode.

NCA-2 AS PRIMARY DISPLAY

- Backlit, 640-character display.
- Supports SCS Series smoke control system in FSCS mode when SCS is connected to the NCA-2 used as primary display.
- Supports DVC digital audio loop.
- Printer and CRT EIA-232 ports.
- EIA-485 annunciator and terminal mode ports.
- Alarm, Trouble, Supervisory, and Security relays.

FLASHSCAN® INTELLIGENT FEATURES

- Polls up to 318 devices in less than two seconds.
- Activates up to 159 outputs in less than five seconds.
- Multicolor LEDs blink device address during Walk Test.
- Fully digital, high-precision protocol (U.S. Patent 5,539,389).
- Manual sensitivity adjustment — up to nine levels.
- Pre-alarm ONYX intelligent sensing — up to nine levels.
- Day/Night automatic sensitivity adjustment.
- Sensitivity windows:
  - **– Ion** – 0.5 to 2.5%/foot obscuration.
  - **– Photo** – 0.5 to 2.35%/foot obscuration.
  - **– Laser (VIEW®)** – 0.02 to 2.0%/foot obscuration.
  - **– Acclimate Plus™** – 0.5 to 4.0%/foot obscuration.
  - **– IntelliQuad™** – 1.0 to 4.0%/foot obscuration.
  - **– IntelliQuad™ PLUS –** 1.0 to 4.0%/foot obscuration
- Drift compensation (U.S. Patent 5,764,142).
- Degraded mode — in the unlikely event that the CPU2-640 microprocessor fails, FlashScan detectors revert to degraded operation and can activate the CPU2-640 NAC circuits and alarm relay. Each of the four built-in panel circuits includes a Disable/Enable switch for this feature.
- Multi-detector algorithm involves nearby detectors in alarm decision (U.S. Patent 5,627,515).
- Automatic detector sensitivity testing (NFPA-72 compliant).
- Maintenance alert (two levels).
- Self-optimizing pre-alarm.

FSL-751 (VERY INTELLIGENT EARLY WARNING) SMOKE DETECTION TECHNOLOGY

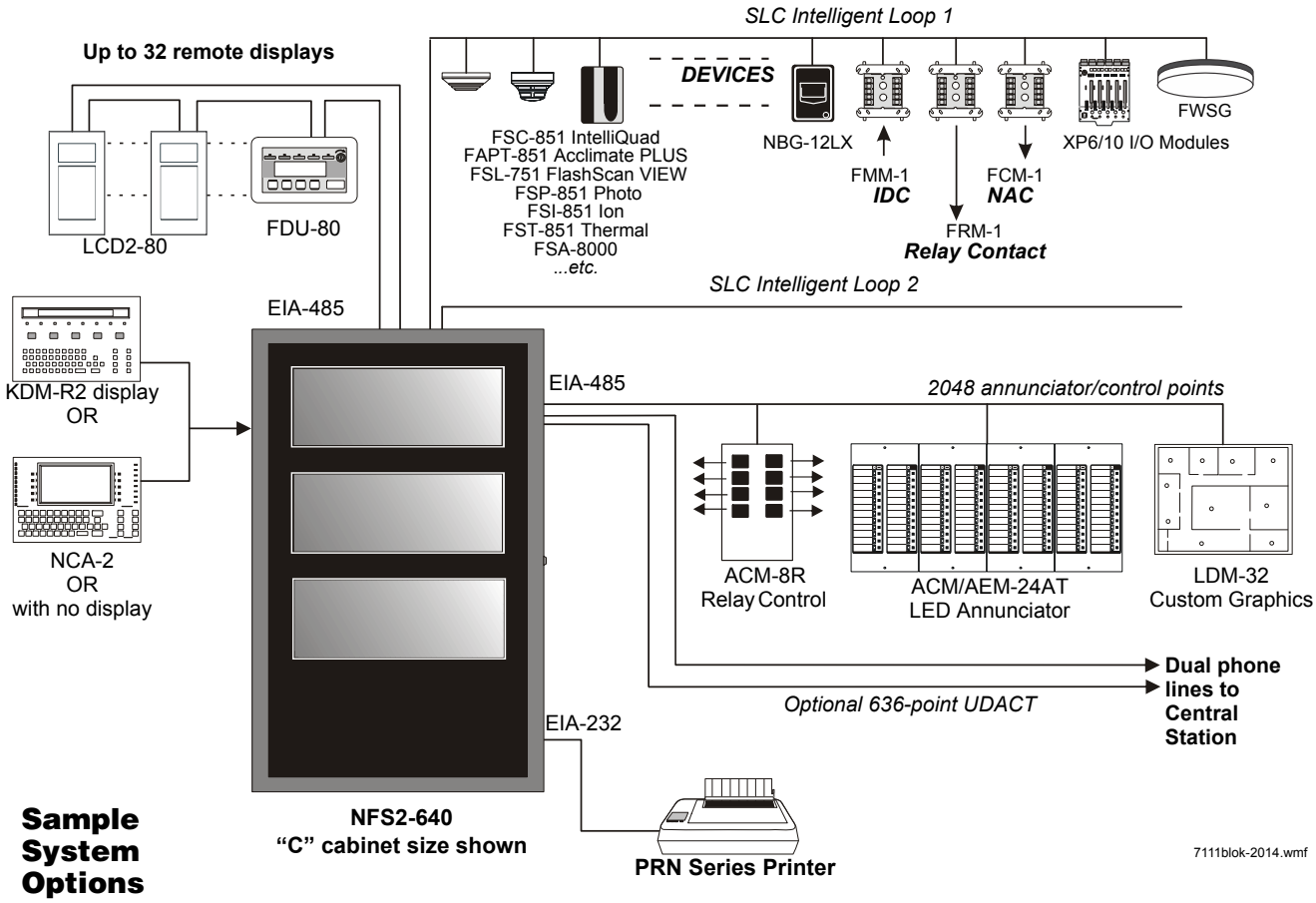
- Advanced ONYX intelligent sensing algorithms differentiate between smoke and non-smoke signals (U.S. Patent 5,831,524).
- Addressable operation pinpoints the fire location.
- Early warning performance comparable to the best aspiration systems at a fraction of the lifetime cost.

FAPT-851 ACCLIMATE PLUS LOW-PROFILE INTELLIGENT MULTI-SENSOR

- Detector automatically adjusts sensitivity levels without operator intervention or programming. Sensitivity increases with heat.
- Microprocessor-based technology; combination photo and thermal technology.
- Low-temperature warning signal at 40°F ± 5°F (4.44°C ± 2.77°C).

FSC-851 INTELLIQUAD ADVANCED MULTI-CRITERIA DETECTOR

- Detects all four major elements of a fire (smoke, heat, CO, and flame).
- Automatic drift compensation of smoke sensor and CO cell.
- High nuisance-alarm immunity.



Sample System Options

INTELLIGENT FAAST® DETECTORS FSA-5000, FSA-8000, AND FSA-20000

- Connects directly to the SLC loop of compatible ONYX series panels.
- Provides five event thresholds that can be individually programmed with descriptive labels for control-by-event programming; uses five detector addresses.
- Uses patented particle separator and field-replaceable filter to remove contaminants.
- Advanced algorithms reject common nuisance conditions
- FSA-5000 covers 5,000 square feet through one pipe.
- FSA-8000 covers 8,000 square feet through one pipe.
- FSA-20000 covers 28,800 square feet through one to four pipes.

***FCO-851 INTELLIQUAD™* PLUS**
ADVANCED MULTI-CRITERIA FIRE/CO DETECTOR

- Detects all four major elements of a fire.
- Separate signal for life-safety CO detection.
- Optional addressable sounder base for Temp-3 (fire) or Temp-4 (CO) tone.
- Automatic drift compensation of smoke sensor and CO cell.
- High nuisance-alarm immunity.

SWIFT WIRELESS

- Self-healing mesh wireless protocol.
- Each SWIFT Gateway supports up to 50 devices: 1 wireless gateway and up to 49 SWIFT devices.
- Up to 4 wireless gateways can be installed with overlapping network coverage.

RELEASING FEATURES

- Ten independent hazards.
- Sophisticated cross-zone (three options).
- Delay timer and Discharge timers (adjustable).
- Abort (four options).
- Low-pressure CO_2 listed.

DIGITAL VOICE AND TELEPHONE FEATURES

- Up to eight channels of digital audio.
- 35, 50, 75, and 100/125 watt digital amplifiers (DAA2/DAX series and DS series; NCA-2 required as primary display).
- Solid-state digital message generation.
- Firefighter telephone option.
- 30- to 120-watt high-efficiency amplifiers (AA Series).
- Backup tone generator and amplifier option.
- NFS2-640 can also integrate with the FirstCommand Emergency Communications System. *See DN-60772.*

HIGH-EFFICIENCY OFFLINE SWITCHING
3.0 A POWER SUPPLY (6.0 A IN ALARM)

- 120 VAC (NFS2-640); 240 VAC (NFS2-640E).
- Displays battery current/voltage on panel (with display).

FlashScan, Exclusive World-Leading Detector Protocol

At the heart of the NFS2-640 is a set of detection devices and device protocol — FlashScan (U.S. Patent 5,539,389). FlashScan is an all-digital protocol that gives superior precision and high noise immunity.

In addition to providing quick identification of an active input device, this protocol can also activate many output devices in a fraction of the time required by competitive protocols. This high speed also allows the NFS2-640 to have the largest device per loop capacity in the industry — 318 points — yet every input and output device is sampled in less than two seconds. The microprocessor-based FlashScan detectors have bicolor LEDs that can be coded to provide diagnostic information, such as device address during Walk Test.

ONYX Intelligent Sensing

Intelligent sensing is a set of software algorithms that provides the NFS2-640 with industry-leading smoke detection capability. These complex algorithms require many calculations on each reading of each detector, and are made possible by the high-speed microcomputer used by the NFS2-640.

Drift Compensation and Smoothing: Drift compensation allows the detector to retain its original ability to detect actual smoke, and resist false alarms, even as dirt accumulates. It reduces maintenance requirements by allowing the system to automatically perform the periodic sensitivity measurements required by NFPA 72. Smoothing filters are also provided by software to remove transient noise signals, such as those caused by electrical interference.

Maintenance Warnings: When the drift compensation performed for a detector reaches a certain level, the performance of the detector may be compromised, and special warnings are given. There are three warning levels: (1) Low Chamber value; (2) Maintenance Alert, indicative of dust accumulation that is near but below the allowed limit; (3) Maintenance Urgent, indicative of dust accumulation above the allowed limit.

Sensitivity Adjust: Nine sensitivity levels are provided for alarm detection. These levels can be set manually, or can change automatically between day and night. Nine levels of pre-alarm sensitivity can also be selected, based on predetermined levels of alarm. Pre-alarm operation can be latching or self-restoring, and can be used to activate special control functions.

Self-Optimizing Pre-Alarm: Each detector may be set for "Self-Optimizing" pre-alarm. In this special mode, the detector "learns" its normal environment, measuring the peak analog readings over a long period of time, and setting the pre-alarm level just above these normal peaks.

Cooperating Multi-Detector Sensing: A patented feature of ONYX intelligent sensing is the ability of a smoke sensor to consider readings from nearby sensors in making alarm or pre-alarm decisions. Without statistical sacrifice in the ability to resist false alarms, it allows a sensor to increase its sensitivity to actual smoke by a factor of almost two to one.

Field Programming Options

Autoprogram is a timesaving feature. The FACP "learns" what devices are physically connected and automatically loads them in the program with default values for all parameters. Requiring less than one minute to run, this routine allows the user to have almost immediate fire protection in a new installation, even if only a portion of the detectors are installed.

Keypad Program Edit (with KDM-R2) The NFS2-640, like all NOTIFIER intelligent panels, has the exclusive feature of program creation and editing capability from the front panel keypad, while continuing to provide fire protection. The architecture of the NFS2-640 software is such that each point entry carries its own program, including control-by-event links to other points. This allows the program to be entered with independent per-point segments, while the NFS2-640 simultaneously monitors other (already installed) points for alarm conditions.

VeriFire® Tools is an offline programming and test utility that can greatly reduce installation programming time, and increase confidence in the site-specific software. It is Windows®-based and provides technologically advanced capabili-

ties to aid the installer. The installer may create the entire program for the NFS2-640 in the comfort of the office, test it, store a backup file, then bring it to the site and download from a laptop into the panel.

Placement of Equipment in Chassis and Cabinet

The following guidelines outline the NFS2-640's flexible system design.

Rows: The first row of equipment in the cabinet mounts in the chassis shipped with the FACP. Mount the second, third, or fourth rows of equipment in a CHS-4 series chassis or, for Digital Voice Command products, in CA-1 or CA-2. (For DVC-EM and DAA2/DAX components see *DVC Manual*; for DS series components see *DS-AMP Manual*; for DVC-AO applications, see *AA Series Installation Manual*). Other options are available; see your panel's installation manual.

Wiring: When designing the cabinet layout, consider separation of power-limited and non-power-limited wiring as discussed in the *NFS2-640 Installation Manual*.

Positions: A chassis offers four basic side-by-side positions for components; the number of modules that can be mounted in each position depends on the chassis model and the size of the individual module. There are a variety of standoffs and hardware items available for different combinations and configurations of components.

It is critical that all mounting holes of the NFS2-640 are secured with a screw or standoff to ensure continuity of Earth Ground.

Layers: The control panel's chassis accepts four layers of equipment, including the control panel. The CPU2-640 fills three positions (left to right) in the first-installed layer (the back of the chassis); its integral power supply occupies the center two positions in the next two layers; the optional display occupies (the left) two positions at the front, flush with the door. Some equipment, such as the NCA-2, may be mounted in the dress panel directly in front of the control panel. The NCA-2 can be used as a primary display for the NFS2-640 (use NCA/640-2-KIT) by directly connecting their network ports (required in Canadian stand-alone applications); see NCA-2 data sheet for mounting options *(DN-7047)*.

Expansion: Installing an LEM-320 Loop Expander Module adds a second SLC loop to the control panel. The LEM-320 is mounted onto the CPU2-640, occupying the middle-right, second (back) slot on the chassis.

Networking: If networking two or more control panels, each unit requires a Network Communication Module or High-Speed Network Communication Module. (HS-NCM can support two nodes; see "Networking Options" on page 5). These modules can be installed in any option board position (see manual), and additional option boards can be mounted in front of the network communication modules.

KDM-R2 Controls and Indicators

Program Keypad: QWERTY type *(keyboard layout, see figure)*.

12 LED indicators: Power; Fire Alarm; Pre-Alarm; Security; Supervisory; System Trouble; Signals Silenced; Points Disabled; Control Active; Abort; Pre-Discharge; Discharge.

Keypad Switch Controls: Acknowledge/Scroll Display; Signal Silence; Drill; System Reset; Lamp Test.

LCD Display: 80 characters (2 x 40) with long-life LED backlight.

Product Line Information

Configuration Guidelines

Stand-alone and network systems require a main display. On systems with one FACP (one CPU2-640/-640E), display options are the KDM-R2 or the NCA-2. On network systems (two or more networked fire panel nodes), at least one NCA-2, NCS, or ONYXWorks annunciation device is required. Other options listed as follows;

KDM-R2: 80-character backlit LCD display with QWERTY programming and control keypad. Order two BMP-1 blank modules and DP-DISP2 mounting plate separately. *Requires top row of a cabinet. Required for each stand-alone 80-character display system. The KDM-R2 may mount in network nodes to display "local" node information as long as at least one NCA-2 or NCS/ONYXWorks network display is on the system to display network information. (Non-English versions also available: KDM-R2-FR, KDM-R2-PO, KDM-R2-SP.)*

NCA-2: Network Control Annunciator, 640 characters. On single *CPU2-640/-640E* systems, the optional NCA-2 can be used as the Primary Display for the panel and connects directly to the *CPU2-640/-640E*. On network systems (two or more networked fire panel nodes), one network display (either NCA-2 or NCS*/ONYXWorks*) is required for every system. On network systems, the NCA-2 connects to (and requires) a standard Network Communication Module or High-Speed Network Communication Module. Mounts in a row of FACP node or in two annunciator positions. Mounting options include the DP-DISP2, ADP-4B, or in an annunciator box, such as the ABS-2D. In CAB-4 top-row applications, a DP-DISP2 and two BMP-1 blank modules are required for mounting. Required for NFS2-640 applications employing the DVC-EM with DAL devices. Non-English versions are available. For marine applications, order NCA-2-M; for non-English Marine applications, order NCA-2-M and the appropriate KP-KIT-XX. *See DN-7047.*

CPU2-640: Central processing unit (CPU) with integral 3.0 A (6.0 A in alarm) power supply for an NFS2-640 system. Includes control panel factory-mounted on a chassis; one Signaling Line Circuit expandable to two; documentation kit. *Order one per system or as necessary (up to 103 network nodes) on a network system. (Non-English versions also available: CPU2-640-FR, CPU2-640-PO, CPU2-640-SP.)*

CPU2-640E: Same as CPU2-640 but requires 240 VAC, 1.5 A, (3.0 A in alarm). *(Non-English versions also available: CPU2-640E-PO, CPU2-640E-SP.)*

NCA/640-2-KIT: Bracket installation kit required to mount NCA-2 to the CPU2-640/-640E's standard chassis.

DP-DISP2: Dress panel for top row in cabinet with CPU2-640/640E installed.

ADP2-640: Dress panel for middle rows with CPU2-640/640E.

BMP-1: Blank module for unused module positions.

BP2-4: Battery plate, required.

LEM-320: Loop Expander Module. Expands each NFS2-640 to two Signaling Line Circuits. *See DN-6881.*

Networking Options

NCM-W, NCM-F: Standard Network Communications Modules. Wire and multi-mode fiber versions available. *See DN-6861*.

HS-NCM-W/MF/SF/WMF/WSF/MFSF: High-speed Network Communications Modules that can connect to two nodes. Wire, single-mode fiber, multi-mode fiber, and media conversion models are available. *See DN-60454.*

RPT-W, RPT-F, RPT-WF: Standard-network repeater board with wire connection (RPT-W), multi-mode fiber connection (RPT-F), or allowing a change in media type between wire and fiber (RPT-WF). Not used with high-speed networks. *See DN-6971.*

ONYXWorks: UL-listed graphics PC workstation, software, and computer hardware. *See DN-7048 for specific part numbers.*

NFN-GW-EM-3: NFN Gateway, embedded. (Replaces NFN-GW-EM.) *See DN-60499.*

NWS-3: NOTI•FIRE•NET™ Web Server. *See DN-6928.*

CAP-GW: Common Alerting Protocol Gateway. *See DN-60756.*

VESDA-HLI-GW: VESDAnet high-level interface gateway. *See DN-60753.*

LEDSIGN-GW: UL-listed sign gateway. Interfaces with classic and high-speed NOTI•FIRE•NET networks through the NFN Gateway. *See DN-60679.*

OAX2-24V: UL-listed LED sign, used with LEDSIGN-GW. *See DN-60679.*

Auxiliary Power Supplies and Batteries

ACPS-610: 6.0 A or 10.0 A addressable charging power supply. *See DN-60244.*

APS2-6R: Auxiliary Power Supply. Provides up to 6.0 amperes of power for peripheral devices. Includes battery input and transfer relay, and overcurrent protection. Mounts on two of four positions on a CHS-4L or CHS-4 chassis. *See DN-5952.*

FCPS-24S6/S8: Remote 6 A and 8 A power supplies with battery charger. *See DN-6927.*

BAT Series: Batteries. NFS2-640 uses two 12 volt, 18 to 200 AH batteries. *See DN-6933.*

Audio Options

***NOTE:** For mounting hardware, see "Enclosures, Chassis, and Dress Plates" on page 7 and peripheral data sheets.*

DVC-EM: Digital Voice Command, digital audio processor with message storage for up to 32 minutes of standard quality (4 minutes at high quality) digital audio. Capable of playing up to eight simultaneous messages when used with Digital Audio Loop (DAL) devices. *See DN-7045.*

DVC-RPU: Digital Voice Command Remote Paging Unit for use with DVC-EM. Includes the keypad/display. *See DN-60726.*

DS-DB: Digital Series Distribution Board, provides bulk amplification capabilities to the DVC-EM while retaining digital audio distribuition capabilities. Can be configured with up to four DS-AMPs, supplying high-level risers spread throughout an installation. *See DN-60565.*

DVC-KD: DVC-EM keypad for local annunciation and controls; status LEDs and 24 user-programmable buttons. *See DN-7045.*

DS-AMP/E: 125W, 25 VRMS, or 100W, 70VRMS. 70VRMS requires DS-XF70V step-up transformer. Digital Series Amplifier, part of the DS-DB system. *See DN-60663.*

DS-RFM, DS-FM, DS-SFM: Fiber conversion modules for DVC-EM, DS-DB distribution board, and DAX and DAA2 Series amplifiers. *See DN-60633.*

DVC-AO: DVC Analog Output board provides four analog output circuits for use with AA Series amplifiers. Four-channel operation supported. *See DN-7045.*

DAA2-5025(E): 50W, 25 Vrms Digital Audio Amplifier assembly with power supply; includes chassis. *See DN-60556.*

DAA2-5070(E): 50W, 70.7 Vrms Digital Audio Amplifier assembly with power supply; includes chassis. *See DN-60556.*

DAA2-7525(E): 75W, 25 Vrms digital audio amplifier assembly with power supply; includes chassis. *See DN-60556.*

DAX-3525(E): 35W, 25 Vrms Digital Audio Amplifier assembly with power supply, includes chassis. *See DN-60561.*

DAX-3570(E): 35W, 70.7 Vrms Digital Audio Amplifier assembly with power supply, includes chassis. *See DN-60561.*

DAX-5025(E): 50W, 25 Vrms Digital Audio Amplifier assembly with power supply, includes chassis. *See DN-60561.*

DAX-5070(E): 50W, 70.7 Vrms Digital Audio Amplifier assembly with power supply, includes chassis. *See DN-60561.*

TELH-1: Firefighter's Telephone Handset for use with the DVC-EM when mounted in the CA-2 chassis. *See DN-7045.*

CMIC-1: Optional microphone and microphone well assembly used with the CA-1 chassis.

RM-1/RM-1SA: Remote microphone assemblies, mount on ADP-4 (RM-1) dress panel or CAB-RM/-RMR (RM-1SA) stand-alone cabinets. *See DN-6728.*

AA-30: Audio Amplifier, 30 watts, 25 Vrms. Includes amplifier and audio input supervision, backup input, and automatic switchover, power supply, cables. *See DN-3224.*

AA-120/AA-100: Audio Amplifier provides up to 120 watts of 25 VRMS audio power for the NFS-640. The amplifier contains an integral chassis for mounting to a CAB-B4, -C4, or -D4 backbox (consumes one row). Switch-mode power. Includes audio input and amplified output supervision, backup input, and automatic switchover to backup tone. Order the AA-100 for 70.7 VRMS systems and 100 watts of power. *See DN-3224.*

DAA Series Digital Audio Amplifiers: Legacy DAA Series amplifiers are compatible with DVC-EM systems running SR4.0. For specific information on DAA-50 series amplifiers, refer to DN-7046. For information on DAA-7525 Series, refer to DN-60257.

NFC-25/50: 25 watt, 25 VRMS, emergency Voice Evacuation Control Panel (VECP) with integral commercial microphone, digital message generator, and single-/dual-channel Class A or Class B speaker circuits. *See DN-60772.*

Compatible Devices, EIA-232 Ports

PRN-6: 80-column printer. *See DN-6956.*

PRN-7: 80-column printer. *See DN-60897.*

VS4095/5: Printer, 40-column, 24V. Mounted in external backbox. *See DN-3260.*

DPI-232: Direct Panel Interface, specialized modem for extending serial data links to remotely located FACPs and/or peripherals. *See DN-6870.*

Compatible Devices, EIA-485 Ports

ACM-24AT: ONYX Series ACS annunciator – up to 96 points of annunciation with Alarm or Active LED, Trouble LED, and switch per circuit. Active/Alarm LEDs can be programmed (by powered-up switch selection) by point to be red, green, or yellow; the Trouble LED is always yellow. *See DN-6862.*

AEM-24AT: Same LED and switch capabilities as ACM-24AT, expands the ACM-24AT to 48, 72, or 96 points. *See DN-6862.*

ACM-48A: ONYX Series ACS annunciator – up to 96 points of annunciation with Alarm or Active LED per circuit. Active/Alarm LEDs can be programmed (by powered-up switch selection) in groups of 24 to be red, green, or yellow. Expandable to 96 points with one AEM-48A. *See DN-6862.*

AEM-48A: Same LED capabilities as ACM-48A, expands the ACM-48A to 96 points. *See DN-6862.*

ACM-8R: Remote Relay Module with eight Form-C contacts. Can be located up to 6,000 ft. (1828.8 m) from panel on four wires. *See DN-3558.*

FDU-80: Terminal mode. 80-character, backlit LCD display. Mounts up to 6,000 ft. (1828.8 m) from panel. Up to 32 per FACP. *See DN-6820.*

LCD2-80: Terminal and ACS mode. 80-character, backlit LCD display. Mounts up to 6,000 ft. (1828.8 m) from panel. Up to 32 per FACP. *See DN-60548.*

LDM: Lamp Driver Modules LDM-32, LDM-E32, and LDM-R32; remote custom graphic driver modules. *See DN-0551.*

SCS: Smoke control stations SCS-8, SCE-8, with lamp drivers SCS-8L, SCE-8L; eight (expandable to 16) circuits (HVAC only). *See DN-4818.*

TM-4: Transmitter Module. Includes three reverse-polarity circuits and one municipal box circuit. Mounts in panel module position (single-address-style) or in CHS2-M2 position. *See DN-6860.*

UDACT-2: Universal Digital Alarm Communicator Transmitter, 636 channel. *See DN-60686.*

UZC-256: Programmable Universal Zone Coder provides positive non-interfering successive zone coding. Microprocessor-controlled, field-programmable from IBM®-compatible PCs (requires optional programming kit). Up to 256 programmable codes. Mounts in **BB-UZC** or other compatible chassis (purchased separately). *See DN-3404.*

Compatible Intelligent Devices

FWSG Wireless SWIFT Gateway: Addressable gateway supports wireless SLC devices. Not appropriate for ULC applications. *See DN-60820.*

FSA-5000: Intelligent FAAST® XS Fire Alarm Aspiration Sensing Technology. Intelligent aspirating smoke detector for applications up to 5,000 sq.ft. For Canadian applications, order FSA-5000A.

FSA-8000: Intelligent FAAST® XM Fire Alarm Aspiration Sensing Technology. Intelligent aspirating smoke detector for applications up to 8,000 sq.ft. For Canadian applications, order FSA-8000A. *See DN-60792.*

FSA-20000: Intelligent FAAST® XT Fire Alarm Aspiration Sensing Technology. Intelligent aspirating smoke detector for applications up to 28,800 sq.ft. For Canadian applications, order FSA-20000A. *See DN-60849.*

FSB-200: Intelligent beam smoke detector. *See DN-6985.*

FSB-200S: Intelligent beam smoke detector with integral sensitivity test. *See DN-6985.*

FSC-851: FlashScan IntelliQuad Advanced Multi-Criteria Detector. *See DN-60412.*

FCO-851: FlashScan IntelliQuad PLUS Advanced Multi-Criteria Fire/CO Detector. *See DN-60689.*

FSI-851: Low-profile FlashScan ionization detector. *See DN-6934.*

FSP-851: Low-profile FlashScan photoelectric detector. *See DN-6935.*

FSP-851T: FSP-851 plus dual electronic thermistors that add 135°F (57°C) fixed-temperature thermal sensing. *See DN-6935.*

FSP-851R: FSP-851, remote-test capable. For use with DNR(W). *See DN-6935.*

FST-851: FlashScan thermal detector 135°F (57°C). *See DN-6936.*

FST-851R: FlashScan thermal detector 135°F (57°C) with rate-of-rise. *See DN-6936.*

FST-851H: FlashScan 190°F (88°C) high-temperature thermal detector. *See DN-6936.*

FAPT-851: FlashScan Acclimate Plus low-profile multi-sensor detector. *See DN-6937.*

FSL-751: FlashScan VIEW laser photo detector. See *DN-6886.*

DNR: InnovairFlex low-flow non-relay duct-detector housing (order FSP-851R separately). Replaces FSD-751PL/FSD-751RPL. *See DN-60429.*

DNRW: Same as above with NEMA-4 rating, watertight. *See DN-60429.*

B224RB: Low-profile relay base. *See DN-60054.*

B224BI: Isolator base for low-profile detectors. *See DN-60054.*

B210LP: Low-profile base. Standard U.S. style. Replaces B710LP. *See DN-60054.*

B501: European-style, 4" (10.16 cm) base. *See DN-60054.*

B200S: Intelligent programmable sounder base, capable of producing a variety of tone patterns including ANSI Temporal 3. Compatible with sychronization protocol. See DN-60054.

B200S-LF: Low-frequency version of B200S. See DN-60054.

B200SCOA: Based on B200SA, with added CO detector markings in English/French. For Canadian applications only.

B200SR: Sounder base, Temporal 3 or Continuous tone. *See DN-60054.*

B200SR-LF: Low-frequency version of B200SR. *See DN-60054.*

FMM-1: FlashScan monitor module. *See DN-6720.*

FDM-1: FlashScan dual monitor module. *See DN-6720.*

FZM-1: FlashScan two-wire detector monitor module. *See DN-6720.*

FMM-101: FlashScan miniature monitor module. *See DN-6720.*

FTM-1: Firephone Telephone Module connects a remote firefighter telephone to a centralized telephone console. Reports status to panel. Wiring to jacks and handsets is supervised. See DN-6989.

FCM-1: FlashScan control module. *See DN-6720.*

FCM-1-REL: FlashScan releasing control module. *See DN-60390.*

FRM-1: FlashScan relay module. *See DN-6720.*

FDRM-1: FlashScan dual monitor/dual relay module. *See DN-60709.*

NBG-12LX: Manual pull station, addressable. *See DN-6726.*

ISO-X: Isolator module. *See DN-2243.*

ISO-6: Six Fault isolator module. For Canadian applications order ISO-6A. *See DN-60844.*

XP6-C: FlashScan six-circuit supervised control module. *See DN-6924.*

XP6-MA: FlashScan six-zone interface module; connects intelligent alarm system to two-wire conventional detection zone. *See DN-6925.*

XP6-R: FlashScan six-relay (Form-C) control module. *See DN-6926.*

XP10-M: FlashScan ten-input monitor module. *See DN-6923.*

SLC-IM: SLC integration module, for VESDAnet detectors. *See DN-60755.*

Enclosures, Chassis, and Dress Plates

CAB-4 Series Enclosure: NFS2-640 mounts in a standard CAB-4 Series enclosure (available in four sizes, "A" through "D"). Backbox and door ordered seperately; requires BP2-4 battery plate. A trim ring option is available for semi-flush mounting. *See DN-6857.*

EQ Series Cabinets: EQ series cabinets will house amplifiers, power supplies, battery chargers and control modules. EQ cabinets are available in three sizes, "B" through "D". *See DN-60229. .*

CAB-BM Marine System: Protects equipment in shipboard and waterfront applications. Also order **BB-MB** for systems using 100 AH batteries. For a full list of required and optional equipment, see *DN-60688.*

CHS-4: Chassis for mounting up to four APS-6Rs.

CHS-4L: Low-profile four-position Chassis. Mounts two AA-30 amplifiers or one AMG-E and one AA-30.

DP-1B: Blank dress panel. Provides dead-front panel for unused tiers; covers DAA2/DAX series or AA-series amplifier.

NFS-LBB: Battery Box (required for batteries larger than 26 AH).

NFS-LBBR: Same as above but red.

CHS-BH1: Battery chassis; holds two 12.0 AH batteries. Mounts one the left side of DAA2 chassis. See DN-7046.

CA-1: Chassis, occupies one tier of a CAB-4 Series enclosure. The left side accommodates one DVC-EM and a DVC-KD (optional); and the right side houses a CMIC-1 microphone and its well (optional). *See DN-7045.*

CA-2: Chassis assembly, occupies two tiers of a CAB-4 Series enclosure. The left side accommodates one DVC-EM mounted on a half-chassis and one NCA-2 mounted on a half-chassis. The right side houses a microphone/handset well. The CA-2 assembly includes CMIC-1 microphone. ADDR Series doors with two-tier visibility are available for use with the CA-2 configuration: ADDR-B4, ADDR-C4, ADDR-D4 (below).

CFFT-1: Chassis to mount firefighter's telephone and one ACS annunciator in a CAB-4 row. Includes TELH-1 firefighter's handset for the DVC-EM, chassis, phone well and mounting hardware. Order DP-CFFT dress panel separately.

DP-CFFT: CFFT-1 dress panel. Requires BMP-1 if no ACS annunciator is installed.

ADDR-B4*: Two-tier-sized door designed for use with the CA-2 chassis configuration. ADDR Series doors are similar to CAB-4 Series "DR" doors, but a clear window space exposes the top two tiers of the CAB-4 enclosure. Use an SBB-B4 backbox with the ADDR-B4. *See DN-7045, DN-6857.*

ADDR-C4*: Three-tier-sized door, designed for use with the CA-2 chassis configuration. ADDR Series doors are similar to CAB-4 Series "DR" doors, but a clear window space exposes the top two tiers of the CAB-4 enclosure. Use an SBB-C4 backbox with the ADDR-C4. *See DN-7045, DN-6857.*

ADDR-D4*: Four-tier-sized door designed for use with the CA-2 chassis configuration. ADDR Series doors are similar to CAB-4 Series "DR" doors, but a clear window space exposes the top two tiers of the CAB-4 enclosure. Use an SBB-D4 backbox with the ADDR-D4. *See DN-7045, DN-6857.*

*Use ADDR-B4/C4/D4 when CA-2 chassis is installed in top two rows with NCA-2 or BP-CA2. Use standard door when CA-2 is not installed in top two rows. For additional configuration information, see the DVC application guide on http://esd.notifier.com.

DPA-1: Dress panel, used with the CA-1 chassis when configured with a DVC-EM, DVC-KD, and CMIC-1. *See DN-7045.*

DPA-2B: Dress panel used with CA-2 chassis assembly.

VP-2B: Dress panel, required when CA-2 chassis is installed in the top two cabinet rows.

DPA-1A4: Dress panel, used with the CA-1 chassis when the CMIC-1 is not used. Provides mounting options on right two bays for two ACS annunciators, or for blank plates. *See DN-7045.*

BP-CA2: Blank plate for CA-2 chassis.

BB-UZC: Backbox for housing the UZC-256 in applications where the UZC-256 will not fit in panel enclosure. Black; for red, order BB-UZC-R.

SEISKIT-CAB: Seismic mounting kit. Required for seismic-certified applications with NFS2-640 and other equipment mounted in CAB-4 Series Enclosures. Includes battery bracket for two 26 AH batteries.

SEISKIT-LBB: Seismic kit for the NFS-LBB. Includes battery bracket for two 55 AH batteries.

Other Options

411: Slave digital alarm communicator. See DN-6619.

411UDAC: Digital alarm communicator. See DN-6746.

IPDACT-2/2UD, IPDACT Internet Monitoring Module: Connects to primary and secondary DACT telephone output ports for internet communications over customer-provided Ethernet connection. Requires compatible Teldat VisorALARM Central Station Receiver. Can use DHCP or static IP. *See DN-60408.*

IPCHSKIT: IP Communicator Chassis Mounting Kit. For mounting an IPDACT-2/2UD onto the panel chassis or CHS-4 series chassis. Use IPENC for external mounting applications.

IPSPLT: Y-adapter option allow connection of both panel dialer outputs to one IPDACT-2/2UD cable input.

IPENC: External enclosure for IPDACT, includes IPBRKT mounting bracket; Red. For Black order IPENC-B.

IPGSM-4G: Internet and Digital Cellular Fire Alarm Communicator. Provides selectable configurable paths: cellular only, IP only, or IP primary with cellular backup. Connects to the primary and secondary ports of a DACT. For Canadian applications order IPGSM-4GC. *See DH-60769.*

***NOTE:** For other options including compatibility with retrofit equipment, refer to the panel's installation manual, the SLC manual, and the Device Compatibility Document.*

System Specifications

System Capacity

- Intelligent Signaling Line Circuits .....1 expandable to 2
- Intelligent detectors ..... 159 per loop
- Addressable monitor/control modules ..... 159 per loop
- Programmable software zones..... 99
- Special programming zones..... 14
- LCD annunciators per CPU2-640/-640E and NCA-2 *(observe power)*..... 32
- ACS annunciators per CPU2-640/-640E ..... 32 addresses x 64 points

- ACS annunciators per NCA-2.....32 addresses x 64 or 96 points

NOTE: *The NCA-2 supports up to 96 annunciator address points per ACM-24AT/-48A.*

Electrical Specifications

- Primary input power:
  - CPU2-640 board: 120 VAC, 50/60 Hz, 5.0 A.
  - CPU2-640E board: 220/240 VAC, 50/60 Hz, 2.5 A.
- Current draw (standby/alarm):
  - CPU2-640(E) board: 0.250 A. Add 0.035 A for each NAC in use.
  - KDM-R2: 0.100 A.
  - LEM-320: 0.100 A.
- Total output 24 V power: 6.0 A in alarm.

NOTE: *The power supply has a total of 6.0 A. of available power. This is shared by all internal circuits. See Installation Manual for a complete current draw calculation sheet.*

- Standard notification circuits (4): 1.5 A each.
- Resettable regulated 24V power: 1.25 A.
- Two non-resettable regulated 24V power outputs:
  - 1.25 A.
  - 0.50 A.
- Non-resettable 5V power: 0.15 A.
- Battery charger range: 18 AH – 200 AH. Use separate cabinet for batteries over 26 AH.
- Float rate: 27.6 V.

Cabinet Specifications

- Systems can be installed in CAB-4 Series cabinets *(four sizes with various door options, see DN-6857)*. Requires BP2-4 Battery Plate.

Shipping Weight

- CPU2-640/-640: 14.3 lb (6.49 kg).
- CPU2-640/-640E: 14.55 lb (6.60 kg).

Temperature and Humidity Ranges

This system meets NFPA requirements for operation at 0 – 49°C/32 – 120°F and at a relative humidity 93% ± 2% RH (noncondensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15 – 27°C/60 – 80°F.

Agency Listings and Approvals

The listings and approvals below apply to the basic NFS2-640 control panel. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL Listed:** S635.
- **ULC Listed:** S635.
- **FM Approved.**
- **MEA:** 128-07-E.
- **Fire Dept. of New York:** #6121.
- **CSFM:** 7165-0028:0243.
- **City of Chicago.**
- **City and County of Denver.**
- **CCCF listed.**

Marine Applications: Marine approved systems must be configured using components itemized in this document. (See Main System Components, in "Product Line Information.) Specific connections and requirements for those components are described in the installation document, PN 54756. When these requirements are followed, systems are approved by the following agencies:

- **US Coast Guard** 161.002/50/0, 161.002/55/0 (Standard 46 CFR and 161.002).
- **Lloyd's Register** 11/600013 (ENV 3 category).
- **American Bureau of Shipping** (ABS) Type Approval.

NOTE: *For information on marine applications, see DN-60688.*

Standards

The NFS2-640 complies with the following UL Standards and NFPA 72, International Building Code (IBC), and California Building Code (CBC) Fire Alarm Systems requirements:

- **UL 864, 9th Edition** (Fire).
- **UL 1076** (Burglary).
- **UL 2572** (Mass Notification Systems). (NFS2-640 version 20 or higher.)
- **LOCAL** (Automatic, Manual, Waterflow and Sprinkler Supervisory).
- **AUXILIARY** (Automatic, Manual and Waterflow) (requires TM-4).
- **REMOTE STATION** (Automatic, Manual, Waterflow and Sprinkler Supervisory) (requires TM-4).
- **PROPRIETARY** (Automatic, Manual and Waterflow). *Not applicable for FM.*
- **EMERGENCY VOICE/ALARM**.
- **OT, PSDN** (Other Technologies, Packet-switched Data Network).
- **IBC 2012, IBC 2009, IBC 2006, IBC 2003, IBC 2000** (Seismic).
- **CBC 2007** (Seismic).

ISO 9001 CERTIFIED ENGINEERING & MANUFACTURING QUALITY SYSTEMS

This document is not intended to be used for installation purposes.
We try to keep our product information up-to-date and accurate.
We cannot cover all specific applications or anticipate all requirements.
All specifications are subject to change without notice.

Made in the U.S. A.

For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

NBG-12LX

Addressable Manual Pull Station

NOTIFIER® by Honeywell

Intelligent/Addressable Devices

General

The Notifier NBG-12LX is a state-of-the-art, dual-action (i.e., requires two motions to activate the station) pull station that includes an addressable interface for any Notifier intelligent control panel except FireWarden series panels, and the NSP-25 panel. Because the NBG-12LX is addressable, the control panel can display the exact location of the activated manual station. This leads fire personnel quickly to the location of the alarm.

Features

- Maintenance personnel can open station for inspection and address setting without causing an alarm condition.
- Built-in bicolor LED, which is visible through the handle of the station, flashes in normal operation and latches steady red when in alarm.
- Handle latches in down position and the word “ACTIVATED” appears to clearly indicate the station has been operated.
- Captive screw terminals wire-ready for easy connection to SLC loop (accepts up to 12 AWG/3.25 mm² wire).
- Can be surface mounted (with SB-10 or SB-I/O) or semi-flush mounted. Semi-flush mount to a standard single-gang, double-gang, or 4" (10.16 cm) square electrical box.
- Smooth dual-action design.
- Meets ADAAG controls and operating mechanisms guidelines (Section 4.1.3[13]); meets ADA requirement for 5 lb. maximum activation force.
- Highly visible.
- Attractive shape and textured finish.
- Key reset.
- Includes Braille text on station handle.
- Optional trim ring (BG12TR).
- Meets UL 38, Standard for Manually Actuated Signaling Boxes.
- Up to 99 NBG-12LX stations per loop on CLIP protocol loops.
- Up to 159 NBG-12LX stations per loop on FlashScan® protocol loops.
- Dual-color LED blinks green to indicate normal on FlashScan® systems.

Construction

Shell, door, and handle are molded of durable polycarbonate material with a textured finish.

Specifications

- **Shipping Weight:** 9.6 oz. (272.15 g)
- **Normal operating voltage:** 24 VDC.
- **Maximum SLC loop voltage:** 28.0 VDC.
- **Maximum SLC standby current:** 375 µA.
- **Maximum SLC alarm current:** 5 mA.
- **Temperature Range:** 32°F to 120°F (0°C to 49°C)
- **Relative Humidity:** 10% to 93% (noncondensing)
- **For use indoors in a dry location**

The NBG-12LX
Addressable Manual Pull Station

Installation

The NBG-12LX will mount semi-flush into a single-gang, double-gang, or standard 4" (10.16 cm) square electrical outlet box, or will surface mount to the model SB-10 or SB-I/O surface backbox. If the NBG-12LX is being semi-flush mounted, then the optional trim ring (BG12TR) may be used. The BG12TR is usually needed for semi-flush mounting with 4" (10.16 cm) or double-gang boxes (not with single-gang boxes).

Operation

Pushing in, then pulling down on the handle causes it to latch in the down/activated position. Once latched, the word “ACTIVATED” (in bright yellow) appears at the top of the handle, while a portion of the handle protrudes from the bottom of the station. To reset the station, simply unlock the station with the key and pull the door open. This action resets the handle; closing the door automatically resets the switch.

Each manual station, on command from the control panel, sends data to the panel representing the state of the manual switch. Two rotary decimal switches allow address settings (1 – 159 on FlashScan® systems, 1 – 99 on CLIP systems).

Architectural/Engineering Specifications

Manual Fire Alarm Stations shall be non-coded, with a key-operated reset lock in order that they may be tested, and so designed that after actual Emergency Operation, they cannot be restored to normal except by use of a key. An operated station shall automatically condition itself so as to be visually detected as activated. Manual stations shall be constructed of red-colored polycarbonate material with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in white letters, 1.00 inches (2.54 cm) or larger. Stations shall be suitable for surface mounting on matching backbox SB-10 or SB-I/O; or semi-flush mounting on a standard single-gang, double-gang, or

4" (10.16 cm) square electrical box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) or per national/local requirements. Manual Stations shall be Underwriters Laboratories listed.

Manual stations shall connect with two wires to one of the control panel SLC loops. The manual station shall, on command from the control panel, send data to the panel representing the state of the manual switch. Manual stations shall provide address setting by use of rotary decimal switches.

The loop poll LED shall be clearly visible through the front of the station. The LED shall flash while in the normal condition, and stay steadily illuminated when in alarm.

Product Line Information

NBG-12LX: Dual-action addressable pull station. Includes key locking feature. (Listed for Canadian and non-Canadian applications.)

NBG-12LXSP: Spanish/English labelled version.

NBG-12LXP: Portuguese labelled version.

SB-10: Surface backbox; metal.

SB-I/O: Surface backbox; plastic.

BG12TR: Optional trim ring.

17021: Keys, set of two.

NY-Plate: New York City trim plate.

Agency Listings and Approvals

In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL/ULC Listed:** S692 (listed for Canadian and non-Canadian applications).
- **MEA:** 67-02-E.
- **CSFM:** 7150-0028:0199.
- **FDNY:** COA #6085 (NFS2-640), COA #6098 (NFS2-3030).
- **BSMI:** CI313066760047.
- **U.S. Coast Guard.**
- **Lloyd's Register.**
- **FM Approved.**

Patented: U.S. Patent No. D428,351; 6,380,846; 6,314,772; 6,632,108.

For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

LCD-80

Liquid Crystal Display

NOTIFIER® by Honeywell

Annunciator Control Systems

General

The LCD-80 is an 80-character, backlit LCD display annunciator for the NOTIFIER NFS2-640, NFS2-3030, NFS-320 fire alarm control panels, or the NCA-2 network control annunciator. Up to 32 LCD-80s may be connected onto the two-wire EIA-485 port. The LCD-80 has two basic modes of operation, "Terminal" and "ACS" mode.

NOTE: *The* LCD-80 *can also be used with Legacy panels. Please refer to the* LCD-80 *manual for more information.*

Common Features

- Listed to UL Standard 864, Ninth Edition
- 80-character backlit Liquid Crystal Display (20 characters x 4 lines).
- Control switches for System Acknowledge, Signal Silence and System Reset.
- Time and date display field.
- Enable Key switch option.
- Can be remotely located up to 6,000 ft. (1828.8 m) from the control panel.
- Local piezo sounder with alarm/trouble resound.
- Flush/surface/panel mount option.

ACS Mode

When operated in "ACS" mode, the LCD-80 provides vectored annunciation capability. Individual devices/zones can be installer-defined to only display at specific locations

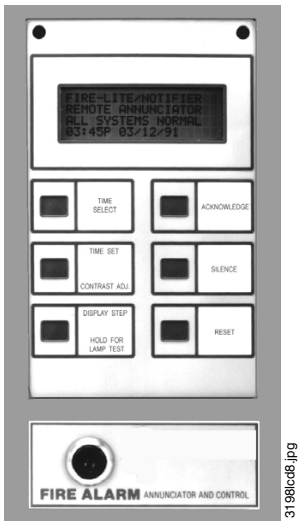
EXAMPLE: *A maintenance office receives only non-alarm point activations. These inputs could be sump pump on, high water, backup AHU on, low temperature in freezer, etc.*

- Alarm/trouble count.
- Custom "normal" message.
- European option: first alarm/last alarm/alarm count.
- Field-programmable messages from CRT or PC-compatible computer (PK-LCD80 Programming Kit required).
- EIA-485 interface: up to 32 per system.
- Printer output port: EIA-232, compatible with PRN Series printers.
- Field-programmable messages in nonvolatile memory in two options: 128 points, 40 character labels; or 256 points, 20 character labels.
- Internal nonvolatile clock for time and date in ACS mode.

Terminal Mode

In "Terminal" mode, the LCD-80 mimics the NFS2-640, NFS2-3030, NFS-320, and NCA-2 displays. Up to 32 LCD-80s can annunciate and provide remote reset, acknowledge, and silence of the control panel from remote locations.

- Displays device type identifiers.
- Device and zone custom alpha labels.
- Time/date and Device address.
- May operate in addition to CRT.
- No programming necessary. LCD-80 displays time, date, and custom messages received from the panel or network annunciator



LCD-80 with ABF-1B

- NFS2-3030 and NCA-2 firmware version 14.0 and higher supports LCD-80 in terminal mode.
- LCD-80 is 8.25" (20.96 cm) high, 4.375" (11.11 cm) wide, and 1.75" (4.45 cm) deep.
- Up to LCD-80s may be used on one EIA-485 circuit.

NOTE: *Must have sufficient regulated 24 volt power. Certain* NOTIFIER *systems may have limits to the amount of* LCD-80*s with ACK/STEP, Signal Silence, and Reset switches.*

- LCD-80 mounts with any CHS-4 chassis slot.
- Up to 32 LCD-80s may be used in a continuous 4-wire loop (verify sufficient 24 VDC available).
- Each may have ACK/STEP, SIGNAL SILENCE, and SYSTEM RESET switches.
- Displays all analog, addressable points.
- No programming required for LCD-80s.

The ABF-1DB Backbox

The **ABF-1DB** is a semi-flush-mount backbox for the NOTIFIER LCD-80 Series Annunciator. The ABF-1DB mounts one LCD-80. It includes an attractive smoked-glass door with NOTIFIER keylock.

Dimensions, BOX only: 9.938" (25.24 cm) high, 4.625" (11.75 cm) wide, 2.5" (6.35 cm) deep.

Dimensions, DOOR only: 10.713" (27.21 cm) high, 6.0" (15.24 cm) wide, 0.75" (1.9 cm) deep.

Related Options

PK-LCD80 (only available for download): Off-Line Programming Kit for LCD-80. Allows PC programming messages when LCD-80 is used in the ACS mode.

ABF-1DB: Semi-flush box with alternative smoked-glass door, any keylock.

ADP-4B: Annunciator Dress Plate, black. Allows panel mounting of up to four LCD-80 modules in a CAB-4 Series cabinet.

ABF-1B: Annunciator Flush Box, 9.938" (25.24 cm) high, 4.625" (11.75 cm) wide, and 2.5" (6.35 cm) deep. Order AKS-1B key switch if desired. Can also be mounted in ABF-2B or ABF-4B annunciator backboxes.

ABS-1TB: Deep Surface Backbox (mounts one LCD-80).

AKS-1B: Key Switch (black) to enable/disable controls when mounted in ABF or ABS-1TB.

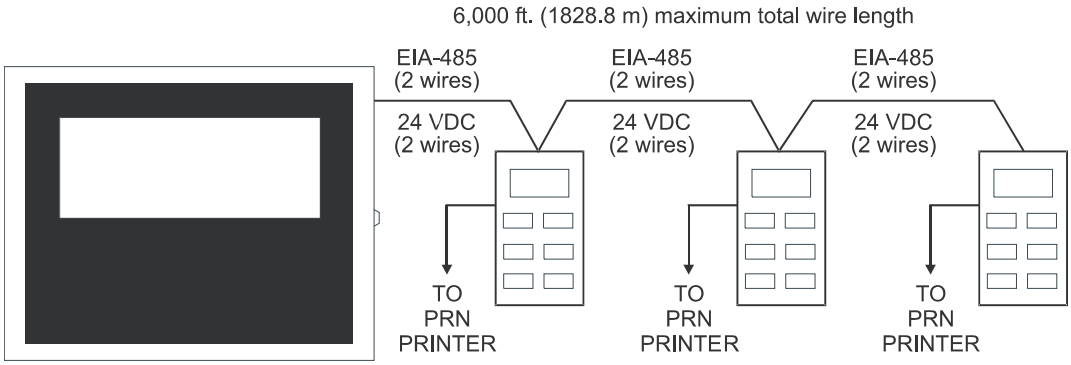
PRN-6: 80-Column Serial Printer (see PRN data sheet).

Agency Listings and Approvals

These listings and approvals apply to the modules specified in this document. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

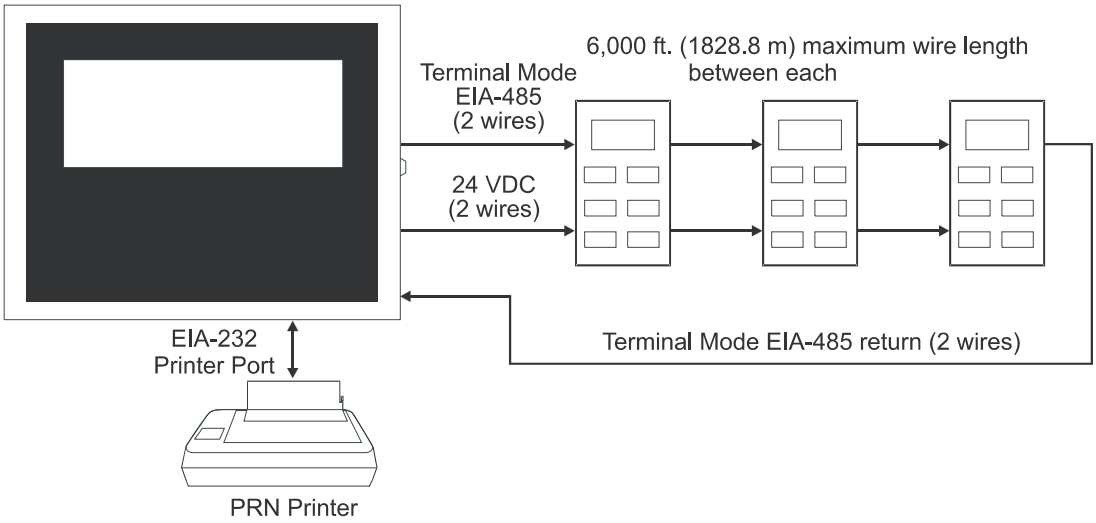
- **UL Listed:** S635
- **ULC Listed:** S635
- **MEA:** 345-02-E; 317-01-E (NFS-640); 128-07-E
- **FDNY:** COA#6026, 6038
- **CSFM:** 7120-0028:156
- **FM Approved**

The LCD-80 in ACS Mode



NFS-320, NFS2-640, NFS2-3030, or NCA-2 connecting to LCD-80

The LCD-80 in Terminal Mode



NFS-320, NFS2-640, NFS2-3030, or NCA-2connecting to LCD-80

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QUALITY SYSTEMS

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www.notifier.com

FSP-851(A) Series

Intelligent Plug-In Photoelectric Smoke Detectors with FlashScan®

NOTIFIER® by Honeywell

Intelligent/Addressable Devices

General

Notifier FSP-851(A) Series intelligent plug-in smoke detectors with integral communication provide features that surpass conventional detectors. Detector sensitivity can be programmed in the control panel software. Sensitivity is continuously monitored and reported to the panel. Point ID capability allows each detector's address to be set with rotary, decimal address switches, providing exact detector location for selective maintenance when chamber contamination reaches an unacceptable level. The FSP-851(A) photoelectric detector's unique optical sensing chamber is engineered to sense smoke produced by a wide range of combustion sources. Dual electronic thermistors add 135°F (57°C) fixed-temperature thermal sensing on the FSP-851T(A). The FSP-851R(A) is a remote test capable detector for use with DNR(A)/DNRW duct detector housings. FSP-851(A) series detectors are compatible with Notifier Onyx and CLIP series Fire Alarm Control Panels (FACPs).

FlashScan® (U.S. Patent 5,539,389) is a communication protocol developed by Notifier that greatly increases the speed of communication between analog intelligent devices. Intelligent devices communicate in a grouped fashion. If one of the devices in the group has new information, the panel's CPU stops the group poll and concentrates on single points. The net effect is response speed greater than five times that of earlier designs.

Features

- Sleek, low-profile design.
- Addressable-analog communication.
- Stable communication technique with noise immunity.
- Low standby current.
- Two-wire SLC connection.
- Compatible with FlashScan® and CLIP protocol systems.
- Rotary, decimal addressing (1-99 on CLIP systems, 1-159 on FlashScan systems).
- Optional remote, single-gang LED accessory.
- Dual LED design provides 360° viewing angle.
- Visible bi-color LEDs blink green every time the detector is addressed, and illuminate steady red on alarm *(FlashScan systems only)*.
- Remote test feature from the panel.
- Walk test with address display (an address on 121 will blink the detector LED: 12-[pause]-1*(FlashScan systems only)*.
- Built-in functional test switch activated by external magnet.
- Built-in tamper-resistant feature.
- Sealed against back pressure.
- Constructed of off-white fire-resistant plastic, designed to commercial standards, and offers an attractive appearance.
- 94-5V plastic flammability rating.
- SEMS screws for wiring of the separate base.
- Optional relay, isolator, and sounder bases.

B210-2951.jpg

FSP-851(A) in B210LP(A) Base

Specifications

Sensitivity: 0.5% to 2.35% per foot obscuration

Size: 2.1" (5.3 cm) high; base determines diameter.

- **B210LP(A):** 6.1" (15.5 cm) diameter.
- **B501(A):** 4.1" (10.4 cm) diameter.
- **B200S(A):** 6.875" (17.46 cm) diameter.
- **B200SR(A):** 6.875" (17.46 cm) diameter.
- **B224RB(A):** 6.2" (15.748 cm) diameter.
- **B224BI(A):** 6.2" (15.748 cm) diameter.

Shipping Weight: 5.2oz. (147g).

Operating Temperature range: FSP-851(A), 0°C to 49°C (32°F to 120°F). FSP-851T(A), 0°C to 38°C (32°F to 100°F). Low temperature signal for FSP-851T(A) at 45°F +/- 10°F (7.22°C +/- 5.54°C). FSP-851R(A) installed in a DNR(A)/DNRW, -20°C to 70°C (-4°F to 158°F).

UL/ULC Listed Velocity Range: 0-4000 ft/min. (1219.2 m/min.), suitable for installation in ducts.

Relative Humidity: 10%-93% noncondensing.

Thermal Ratings: Fixed-temperature setpoint 135°F (57°C).

Detector Spacing and Applications

Notifier recommends spacing detectors in compliance with NFPA 72. In low airflow applications with smooth ceiling, space detectors 30 feet (9.144m) for ceiling heights 10 feet (3.148m) and higher. For specific information regarding detector spacing, placement, and special applications refer to NFPA 72. *System Smoke Detector Application Guide*, document A05-1003, is available at **systemsensor.com**

Electrical Specifications

Voltage Range: 15-32 volts DC peak.

Standby Current (max. avg.): 300µA @ 24VDC (one communication every five seconds with LED enabled).

LED Current (max.): 6.5mA @ 24 VDC ("ON").

Installation

FSP-851(A) plug-in detectors use a separate base to simplify installation, service, and maintenance. A special tool allows maintenance personnel to plug in and remove detectors without using a ladder.

Mount base (all base types) on an electrical backbox which is at least 1.5" (3.81 cm) deep. For a chart of compatible junction boxes, see *DN-60054.*

NOTE: *1) Because of inherent supervision provided by the SLC loop, end-of-line resistors are not required. Wiring "T-taps" or branches are permitted for Style 4 (Class "B") wiring. 2) When using relay or sounder bases, consult the ISO-X(A) installation sheet I56-1380 for device limitations between isolator modules and isolator bases.*

Agency Listings and Approvals

These listings and approvals apply to the modules specified in this document. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. *Consult factory for latest listing status.*

- **UL Listed:** S1115.
- **ULC Listed:** S1115 (FSP-851A, FSP-851RA, FSP-851TA).
- **MEA Listed:** 225-02-E .
- **FM Approved.**
- **CSFM:** 7272-0028:0206 .
- **Maryland State Fire Marshal:** Permit # 2122 **.**
- **BSMI:** CI313066760036.
- **CCCF:** Certif. # 2004081801000017 (FSP-851T) Certif. # 2004081801000016 (FSP-851).
- **U.S. Coast Guard:** 161.002/42/1 (NFS-640); 161.002/50/0 (NFS2-640/NFS-320/NFS-320C, excluding B210LP(A)).
- **Lloyd's Register:** 11/600013 (NFS2-640/NFS-320/NFS-320C, excluding B210LP(A)).

Product Line Information

NOTE: *"A" suffix indicates ULC Listed model.*

FSP-851: Low-profile intelligent photoelectric sensor. Must be mounted to one of the bases listed below.

FSP-851A: Same as FSP-851 but with ULC listing.

FSP-851T: Same as FSP-851 but includes a built-in 135°F (57°C) fixed-temperature thermal device.

FSP-851TA: Same as FSP-851T but with ULC listing.

FSP-851R: Low-profile intelligent photoelectric sensor, remote test capable. For use with DNRA/DNRW.

FSP-851RA: Same as FSP-851R but with ULC listing. For use with DNRA.

Intelligent Bases

NOTE: *"A" suffix indicates ULC Listed model.*

NOTE: *For details on intelligent bases, see DN-60054.*

B210LP(A): Standard U.S. flanged low-profile mounting base.

B210LPBP: Bulk pack of B210LP; package contains 10.

B501(A): Standard European flangeless mounting base.

B501BP: Bulk pack of B501; package contains 10.

B200S(A): Intelligent, programmable sounder base capable of producing sound output in high or low volume with ANSI Temporal 3, ANSI Temporal 4, continuous tone, marching tone, and custom tone.

B200SR(A): Intelligent sounder base capable of producing sound output with ANSI Temporal 3 or continuous tone. Replaces B501BH series bases in retrofit applications.

B224RB(A): Plug-in System Sensor **relay** base. Screw terminals: up to 14 AWG (2.0 mm^2). Relay type: Form-C. Rating: 2.0 A @ 30 VDC resistive; 0.3 A @ 110 VDC inductive; 1.0 A @ 30 VDC inductive.

B224BI(A): Plug-in System Sensor ***isolator*** detector base. Maximum 25 devices between isolator bases.

Accessories

F110: Retrofit flange to convert B210LP(A) to match the B710LP(A) profile, or to convert older high-profile bases to low-profile.

F110BP: Bulk pack of F110; package contains 15.

F210: Replacement flange for B210LP(A) base.

RA100Z(A): Remote LED annunciator. 3 – 32 VDC. Mounts to a U.S. single-gang electrical box. For use with B501(A) and B210LP(A) bases only.

SMB600: Surface mounting kit

M02-04-00: Test magnet.

M02-09-00: Test magnet with telescoping handle.

XR2B: Detector removal tool. Allows installation and/or removal of detector heads from bases in high ceiling applications.

XP-4: Extension pole for XR2B. Comes in three 5-foot (1.524 m) sections.

T55-127-010: Detector removal tool without pole.

BCK-200B: Black detector covers for use with FSP-851(A) only; box of 10.

WCK-200B: White detector covers for use with FSP-851(A) only; box of 10.

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We try to keep our product information up-to-date and accurate.
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For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

FMM-1(A), FMM-101(A), FZM-1(A) & FDM-1(A)

Monitor Modules with FlashScan®

NOTIFIER® by Honeywell

Intelligent/Addressable Devices

General

Four different monitor modules are available for Notifier's intelligent control panels for a variety of applications. Monitor modules supervise a circuit of dry-contact input devices, such as conventional heat detectors and pull stations, or monitor and power a circuit of two-wire smoke detectors (FZM-1(A)).

FMM-1(A) is a standard-sized module (typically mounts to a 4" [10.16 cm] square box) that supervises either a Style D (Class A) or Style B (Class B) circuit of dry-contact input devices.

FMM-101(A) is a miniature monitor module a mere 1.3" (3.302 cm) H x 2.75" (6.985 cm) W x 0.5" (1.270 cm) D that supervises a Style B (Class B) circuit of dry-contact input devices. Its compact design allows the FMM-101(A) to be mounted in a single-gang box behind the device it monitors.

FZM-1(A) is a standard-sized module that monitors and supervises compatible two-wire, 24 volt, smoke detectors on a Style D (Class A) or Style B (Class B) circuit.

FDM-1(A) is a standard-sized dual monitor module that monitors and supervises two independent two-wire Style B (Class B) dry-contact initiating device circuits (IDCs) at two separate, consecutive addresses in intelligent, two-wire systems.

FlashScan® (U.S. Patent 5,539,389) is a communication protocol developed by NOTIFIER that greatly increases the speed of communication between analog intelligent devices. Intelligent devices communicate in a grouped fashion. If one of the devices within the group has new information, the panel CPU stops the group poll and concentrates on single points. The net effect is response speed greater than five times that of other designs.

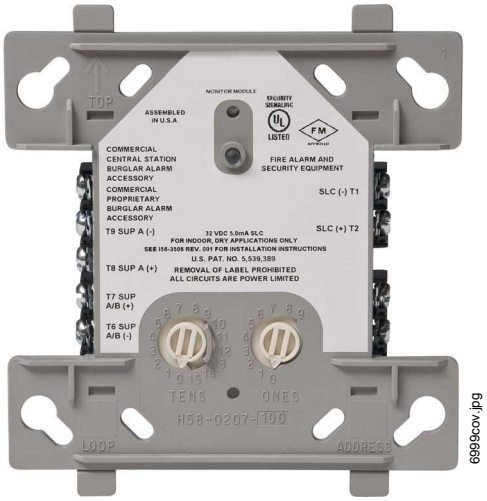
FMM-1(A) Monitor Module

- Built-in type identification automatically identifies this device as a monitor module to the control panel.
- Powered directly by two-wire SLC loop. No additional power required.
- High noise (EMF/RFI) immunity.
- SEMS screws with clamping plates for ease of wiring.
- Direct-dial entry of address: 01 – 159 on FlashScan loops; 01 – 99 on CLIP loops.
- LED flashes green during normal operation (this is a programmable option) and latches on steady red to indicate alarm.

The FMM-1(A) Monitor Module is intended for use in intelligent, two-wire systems, where the individual address of each module is selected using the built-in rotary switches. It provides either a two-wire or four-wire fault-tolerant Initiating Device Circuit (IDC) for normally-open-contact fire alarm and supervisory devices. The module has a panel-controlled LED indicator. The FMM-1(A) can be used to replace MMX-1(A) modules in existing systems.

FMM-1(A) APPLICATIONS

Use to monitor a zone of four-wire smoke detectors, manual fire alarm pull stations, waterflow devices, or other normally-open dry-contact alarm activation devices. May also be used to monitor normally-open supervisory devices with special supervisory indication at the control panel. Monitored circuit may be wired as an NFPA Style B (Class B) or Style D (Class A) Initiating Device Circuit. A 47K ohm End-of-Line Resistor (provided) terminates the Style B circuit. No resistor is required for supervision of the Style D circuit.



FMM-1(A) (Type H)

FMM-1(A) OPERATION

Each FMM-1(A) uses one of the available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC). A flashing LED indicates that the module is in communication with the control panel. The LED latches steady on alarm (subject to current limitations on the loop).

FMM-1(A) SPECIFICATIONS

Nominal operating voltage: 15 to 32 VDC.

Maximum current draw: 5.0 mA (LED on).

Average operating current: 350 µA (LED flashing), 1 communication every 5 seconds, 47k EOL.

Maximum IDC wiring resistance: 40 ohms.

EOL resistance: 47K ohms.

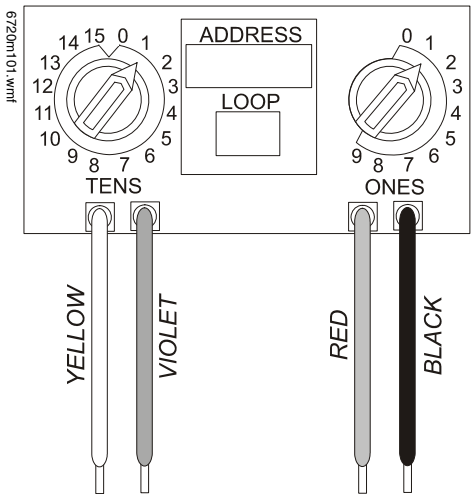
Temperature range: 32°F to 120°F (0°C to 49°C).

Humidity range: 10% to 93% noncondensing.

Dimensions: 4.5" (11.43 cm) high x 4" (10.16 cm) wide x 1.25" (3.175 cm) deep. Mounts to a 4" (10.16 cm) square x 2.125" (5.398 cm) deep box.

FMM-101(A) Mini Monitor Module

- Built-in type identification automatically identifies this device as a monitor module to the panel.
- Powered directly by two-wire SLC loop. No additional power required.
- High noise (EMF/RFI) immunity.
- Tinned, stripped leads for ease of wiring.
- Direct-dial entry of address: 01 – 159 on FlashScan loops; 01 – 99 on CLIP loops.



The FMM-101(A) Mini Monitor Module can be installed in a single-gang junction directly behind the monitored unit. Its small size and light weight allow it to be installed without rigid mounting. The FMM-101(A) is intended for use in intelligent, two-wire systems where the individual address of each module is selected using rotary switches. It provides a two-wire initiating device circuit for normally-open-contact fire alarm and security devices. The FMM-101(A) can be used to replace MMX-101(A) modules in existing systems.

FMM-101(A) APPLICATIONS

Use to monitor a single device or a zone of four-wire smoke detectors, manual fire alarm pull stations, waterflow devices, or other normally-open dry-contact devices. May also be used to monitor normally-open supervisory devices with special supervisory indication at the control panel. Monitored circuit/device is wired as an NFPA Style B (Class B) Initiating Device Circuit. A 47K ohm End-of-Line Resistor (provided) terminates the circuit.

FMM-101(A) OPERATION

Each FMM-101(A) uses one of the available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC).

FMM-101(A) SPECIFICATIONS

Nominal operating voltage: 15 to 32 VDC.

Average operating current: 350 µA, 1 communication every 5 seconds, 47k EOL; 600 µA Max. (Communicating, IDC Shorted).

Maximum IDC wiring resistance: 40 ohms.

Maximum IDC Voltage: 11 Volts.

Maximum IDC Current: 400 µA.

EOL resistance: 47K ohms.

Temperature range: 32°F to 120°F (0°C to 49°C).

Humidity range: 10% to 93% noncondensing.

Dimensions: 1.3" (3.302 cm) high x 2.75" (6.985 cm) wide x 0.65" (1.651 cm) deep.

Wire length: 6" (15.24 cm) minimum.

FZM-1(A) Interface Module

- Supports compatible two-wire smoke detectors.
- Supervises IDC wiring and connection of external power source.
- High noise (EMF/RFI) immunity.
- SEMS screws with clamping plates for ease of wiring.
- Direct-dial entry of address: 01 – 159 on FlashScan loops, 01 – 99 on CLIP loops.
- LED flashes during normal operation; this is a programmable option.
- LED latches steady to indicate alarm on command from control panel.

The FZM-1(A) Interface Module is intended for use in intelligent, addressable systems, where the individual address of each module is selected using built-in rotary switches. This module allows intelligent panels to interface and monitor two-wire conventional smoke detectors. It transmits the status (normal, open, or alarm) of one full zone of conventional detectors back to the control panel. All two-wire detectors being monitored must be UL compatible with the module. The FZM-1(A) can be used to replace MMX-2(A) modules in existing systems.

FZM-1(A) APPLICATIONS

Use the FZM-1(A) to monitor a zone of two-wire smoke detectors. The monitored circuit may be wired as an NFPA Style B (Class B) or Style D (Class A) Initiating Device Circuit. A 3.9 K ohm End-of-Line Resistor (provided) terminates the end of the Style B or D (class B or A) circuit (maximum IDC loop resistance is 25 ohms). Install ELR across terminals 8 and 9 for Style D application.

FZM-1(A) OPERATION

Each FZM-1(A) uses one of the available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC). A flashing LED indicates that the module is in communication with the control panel. The LED latches steady on alarm (subject to current limitations on the loop).

FZM-1(A) SPECIFICATIONS

Nominal operating voltage: 15 to 32 VDC.

Maximum current draw: 5.1 mA (LED on).

Maximum IDC wiring resistance: 25 ohms.

Average operating current: 300 µA, 1 communication and 1 LED flash every 5 seconds, 3.9k eol.

EOL resistance: 3.9K ohms.

External supply voltage (between Terminals T3 and T4): DC voltage: 24 volts power limited. Ripple voltage: 0.1 Vrms maximum. Current: 90 mA per module maximum.

Temperature range: 32°F to 120°F (0°C to 49°C).

Humidity range: 10% to 93% noncondensing.

Dimensions: 4.5" (11.43 cm) high x 4" (10.16 cm) wide x 1.25" (3.175 cm) deep. Mounts to a 4" (10.16 cm) square x 2.125" (5.398 cm) deep box.

FDM1(A) Dual Monitor Module

The FDM-1(A) Dual Monitor Module is intended for use in intelligent, two-wire systems. It provides two independent two-wire initiating device circuits (IDCs) at two separate, consecutive addresses. It is capable of monitoring normally open contact fire alarm and supervisory devices; or either normally open or normally closed security devices. The module has a single panel-controlled LED.

NOTE: *The FDM-1(A) provides two Style B (Class B) IDC circuits ONLY. Style D (Class A) IDC circuits are NOT supported in any application.*

FDM-1(A) SPECIFICATIONS

Normal operating voltage range: 15 to 32 VDC.

Maximum current draw: 6.4 mA (LED on).

Average operating current: 750 µA (LED flashing).

Maximum IDC wiring resistance: 1,500 ohms.

Maximum IDC Voltage: 11 Volts.

Maximum IDC Current: 240 µA

EOL resistance: 47K ohms.

Maximum SLC Wiring resistance: 40 Ohms.

Temperature range: 32° to 120°F (0° to 49°C).

Humidity range: 10% to 93% (non-condensing).

Dimensions: 4.5" (11.43 cm) high x 4" (10.16 cm) wide x 2.125" (5.398 cm) deep.

FDM-1(A) AUTOMATIC ADDRESSING

The FDM-1(A) automatically assigns itself to two addressable points, starting with the original address. For example, if the FDM-1(A) is set to address “26”, then it will automatically assign itself to addresses “26” and “27”.

NOTE: *“Ones” addresses on the FDM-1(A) are 0, 2, 4, 6, or 8 only. Terminals 6 and 7 use the first address, and terminals 8 and 9 use the second address.*

CAUTION:
Avoid duplicating addresses on the system.

Installation

FMM-1(A), FZM-1(A), and FDM-1(A) modules mount directly to a standard 4" (10.16 cm) square, 2.125" (5.398 cm) deep, electrical box. They may also be mounted to the SMB500 surface-mount box. Mounting hardware and installation instructions are provided with each module. All wiring must conform to applicable local codes, ordinances, and regulations. These modules are intended for power-limited wiring only.

The FMM-101(A) module is intended to be wired and mounted without rigid connections inside a standard electrical box. All wiring must conform to applicable local codes, ordinances, and regulations.

Agency Listings and Approvals

In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL:** S635
- **ULC:** S635
- **FM Approved**
- **CSFM:** 7300-0028:0219
- **MEA:** 457-99-E
- **U.S. Coast Guard:**
  - 161.002/23/3 *(AFP-200: FMM-1/-101, FZM-1)*
  - 161.002/42/1 *(NFS-640: FMM-1/-101)*
- **Lloyd’s Register:**
  - 03/60011/E1 *(FMM-1/-101, FZM-1)*
  - 94/60004/E2 *(AFP-200: except FDM-1)*
  - 02/60007 *(NFS-640: FDM-1)*
- **FDNY:** COA #6038 (NFS2-640, NFS-320), COA# 6058 (NFS2-3030)

Product Line Information

NOTE: *“A” suffix indicates ULC-listed model.*

FMM-1(A): Monitor module.

FMM-101(A): Monitor module, miniature.

FZM-1(A): Monitor module, two-wire detectors.

FDM-1(A): Monitor module, dual, two independent Class B circuits.

SMB500: Optional surface-mount backbox.

NOTE: *See installation instructions and refer to the SLC Wiring Manual, PN 51253.*

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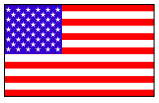


Made in the U.S. A.

For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

FCPS-24S6(C/E) & FCPS-24S8(C/E)

6- & 8-Amp 24-Volt Remote Power Supplies

NOTIFIER® by Honeywell

Power Supplies

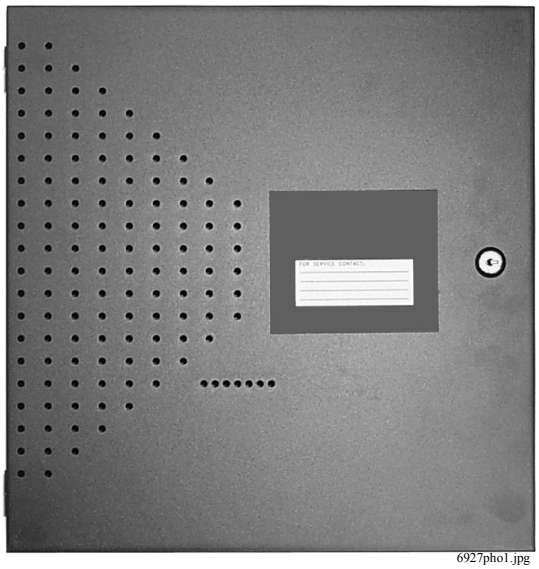
General

The FCPS-24S6E (6-amp) and FCPS-24S8E (8-amp) are remote power supplies with battery charger. The FCPS-24S6/-24S8 may be connected to any 12 or 24 volt fire alarm control panel (FACP) or may be used as stand-alone supplies. Primary applications include notification appliance (bell) circuit (NAC) expansion (to support ADA requirements and NAC synchronization) or auxiliary power to support 24 volt system accessories. The FCPS-24S6/-24S8 provides regulated and filtered 24 VDC power to four notification appliance circuits configured as either four Class B (Style Y) or Class A (Style Z, with ZNAC-4 option module). Alternately, the four outputs may be configured as all non-resettable, all resettable or two non-resettable and two resettable. The FCPS-24S6/-24S8 also contains a battery charger capable of charging up to 18 AH batteries. FCPS-24S6C & FCPS-24S8C are ULC-listed.

NOTE: *Unless otherwise specified, the terms FCPS-24S6 and FCPS-24S8 used in this document refers to the standard FCPS-24S6 and FCPS-24S8, FCPS-24S6C and FCPS-24S8C, the FCPS-24S6E and FCPS-24S8E*

Features

- UL-Listed NAC synchronization using System Sensor, Wheelock, or Gentex "Commander^2" appliances.
- Operates as a "sync-follower" or as a "sync-generator" (default). *See note on page 2.*
- Contains two fully-isolated input/control circuits - triggered from FACP NAC (NAC expander mode) or jumped permanently "ON" (stand-alone mode).
- Four Class B (Style Y) or four Class A (Style Z, with ZNAC-4 module) NACs.
- 6-amp (FCPS-24S6) or 8-amp (FCPS-24S8) full load output, with 3 amps maximum/circuit, in NAC expander mode (UL 864).
- 4-amp (FCPS-24S6) or 6-amp (FCPS-24S8) continuous output in stand-alone mode (UL 1481).
- Compatible with coded inputs; signals passed through.
- Optional power-supervision relay (EOLR-1).
- In stand-alone mode, output power circuits may be configured as: resettable, (reset line from FACP required), non-resettable, or a mix of two and two.
- Fully regulated and filtered power output - optimal for powering four-wire smoke detectors, annunciators, and other system peripherals requiring regulated/filtered power.
- Power-limiting technology meets UL power-limiting requirements.
- Form-C normally-closed trouble relay.
- Fully supervised power supply, battery, and NACs.
- Selectable earth fault detection.
- AC trouble report selectable for immediate 2-hour delay.
- Works with virtually any UL 864 fire alarm control which utilizes an industry-standard reverse-polarity notification circuit (including unfiltered and unregulated bell power).
- Requires input trigger voltage of 9 - 32 VDC.
- Self-contained in compact, locking cabinet - 15"H x 14.5"W x 2.75"D (cm: 38.1H x 36.83W x 6.985D).



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- Includes integral battery charger capable of charging up to 18 AH batteries. Cabinet capable of housing 7.0 AH batteries.
- Battery charger may be disabled via DIP switch for applications requiring larger batteries.
- Fixed, clamp-type terminal blocks accommodate up to 12 AWG (3.1mm^2) wire.

Specifications

Primary (AC) Power:

- FCPS-24S6C/-24S8C: 120 VAC, 60 Hz, 3.2A maximum.
- FCPS-24S6E/-24S8E: 240 VAC, 50 Hz, 1.6A maximum.
- Wire Size: minimum #14 AWG (2.0mm^2) with 600 V insulation.

Control Input Circuit:

- **Trigger Input Voltage:** 9 to 32 VDC.
- **Trigger Current:** 2.0 mA (16 - 32 V); Per Input: 1.0 mA (9 - 16 V).

Trouble Contact Rating: 5 A at 24 VDC.

Auxiliary Power Output: Specific application power 500 mA maximum.

Output Circuits:

- +24 VDC filtered, regulated.
- 3.0 A maximum for any one circuit.
- Total continuous current for all outputs (stand-alone mode):
  - FCPS-24S6: 4.0 A maximum.
  - FCPS-24S8: 6.0 A maximum.
- Total short-term current for all outputs (NAC expander mode):
  - FCPS-24S6: 6.0 A maximum.
  - FCPS-24S8: 8.0 A maximum.

Secondary Power (Battery) Charging Circuit:

- Supports lead-acid batteries only.
- Float-charge voltage: 27.6 VDC.

- Maximum current charge: 1.5 A.
- Maximum battery capacity: 18 AH.

Applications

Example 1: Expand notification appliance power an additional 6.0 A (FCPS-24S6) or 8.0 A (FCPS-24S8). Use up to four Class B (Style Y) outputs or four Class A (Style Z) outputs (using ZNAC-4). For example, the FACP notification appliance circuits will activate the FCPS when reverse-polarity activation occurs. Trouble conditions on the FCPS are sensed by the FACP through the notification appliance circuit.

Example 2: Use the FCPS to expand auxiliary regulated 24-volt system power up to 4.0 A (FCPS-24S6) or up to 6.0 A (FCPS-24S8). Both resettable and non-resettable power options are available. Resettable outputs are created by connecting the resettable output from the FACP to one or both of the FCPS inputs.

Example 3: Use addressable control modules to activate the FCPS instead of activating it through the FACP notification appliance circuits. This typically allows for mounting the FCPS at greater distances* away from the FACP while expanding system architecture in various applications.

For example, an addressable control module is used to activate the FCPS, and an addressable monitor module is used to sense FCPS trouble conditions. Local auxiliary power output from the FCPS provides power to the addressable control module.

***NOTE:** Addressable FACPs are capable of locating control and monitor modules at distances of up to 12,500 feet (3,810 meters).*

Sync Follower/Generator Note

In some installations, it is necessary to synchronize the flash timing of all strobes in the system for ADA compliance. Strobes accomplish this by monitoring very short timing pulses on the NAC power which are created by the FACP. When installed at the end of a NAC wire run, the FCPS-24S6/-24S8 can track (i.e. "follow") the strobe synchronization timing pulses on the existing NAC wire run. This maintains the overall system flash timing of the additional strobes attaches to the FCPS.

When the FCPS-24S6/-24S8 is configured (via DIP switch settings) as a "sync follower," the FCPS's NAC outputs track the strobe synchronization pulses present at the FCPS's sync input terminal. The pulses originate from an upstream FACP or other power supply.

When the FCPS-24S6/-24S8 are configured (via DIP switch settings) as a "sync generator," the FCPS's sync input terminals are not used. Rather, the FCPS is the originator of the strobe synchronization pulses on the FCPS's NAC outputs. In "sync generator" mode, the sync type (System Sensor, Wheelock, or Gentex) is selectable via DIP switch settings.

Standards and Codes

The FCPS-24S6 and FCPS-24S8 comply with the following standards:

- **NFPA 72** National Fire Alarm Code.
- **UL 864** Standard for Control Units for Fire Alarm Systems (NAC expander mode).
- **UL 1481** Power Supplies for Fire Alarm Systems.

Agency Listings and Approvals

These listings and approvals apply to the modules specified in this document. In some cases, certain modules or applications may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL Listed:** S635, S674
- **ULC Listed:** S635 (FCPS-24S6C & FCPS-24S8C)
- **CSFM Approved:** 7315-0028:225
- **MEA:** 299-02-E
- **FM Approved**

Ordering Information

FCPS-24S6: 6.0 A, 120 VAC remote charger power supply. Includes main printed circuit board, transformers, enclosure (15"H x 14.5"W x 2.75"D [cm: 38.1H x 36.83W x 6.985D]), and installation instructions.

FCPS-24S6C: Same as above, ULC-listed.

FCPS-24S6R: Same as FCPS-24S6 with red enclosure.

FCPS-24S6E: 6.0 A, 240 VAC remote charger power supply. Includes main printed circuit board, transformers, enclosure (15"H x 14.5"W x 2.75"D [cm: 38.1H x 36.83W x 6.985D]), and installation instructions.

FCPS-24S8: 8.0 A, 120 VAC remote charger power supply. Includes main printed circuit board, transformers, enclosure (15"H x 14.5"W x 2.75"D [cm: 38.1H x 36.83W x 6.985D]), and installation instructions.

FCPS-24S8C Same as above, ULC-listed.

FCPS-24S8R: Same as FCPS-24S8 with red enclosure.

FCPS-24S8E: 8.0 A, 240 VAC remote charger power supply. Includes main printed circuit board, transformers, enclosure (15"H x 14.5"W x 2.75"D [cm: 38.1H x 36.83W x 6.985D]), and installation instructions.

ZNAC-4: Class A (Style Y) NAC option module.

EOLR-1: 12/24 VDC end-of-line relay for monitoring four-wire smoke detector power.

BAT-1270: Battery, 12-volt, 7.0 AH (two required, see BAT Series data sheet DN-6933).

PS-1270: Battery, 12-volt, 7.0 AH (two required, see PS Series data sheet DN-1109)

For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

DNR(A)/DNRW InnovairFlex

Intelligent Non-Relay Photoelectric Duct Smoke Detector

NOTIFIER® by Honeywell

Intelligent Devices

General

The Notifier InnovairFlex® DNR(A) intelligent non-relay photoelectric duct smoke detector and DNRW watertight non-relay photoelectric duct smoke detector feature a pivoting housing that fits both square and rectangular footprints capable of mounting to a round or rectangular duct.

DNRW duct smoke detector, with its NEMA-4 rating, is listed as a watertight, UV resistant enclosure providing protection against falling dirt, rain, and windblown dust, splashing and hose directed water, allowing operators to use the detector in the most extreme environments.

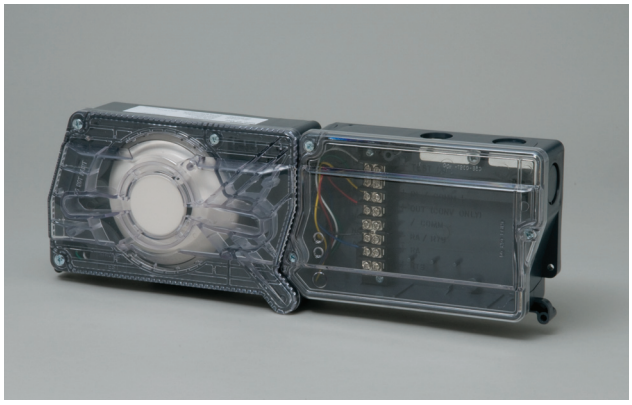
These units sense smoke in the most challenging conditions, operating in airflow speeds of 100 to 4,000 feet per minute (0.5 to 20.32 m/s), temperatures of -4°F to 158°F (-20°C to 70°C), and a humidity range of 0 to 95 percent (non-condensing.)

An improved cover design isolates the sensor head, which allows for ease of maintenance. A cover tamper feature indicates a trouble signal for a removed or improperly installed sensor cover. The Notifier InnovairFlex housing provides a 3/4-inch conduit knockout and ample space to facilitate easy wiring and mounting of a relay module.

The Notifier InnovairFlex duct smoke detector can be customized to meet local codes and specifications without additional wiring. The new InnovairFlex product line is compatible with all previous Innovair models, including remote test accessories.

Features

- Photoelectric, integrated low-flow technology.
- Air velocity rating from 100 ft/min to 4,000 ft/min (0.5 m/s to 20.32 m/s).
- Versatile mounting options: square or rectangular configuration.
- Broad ranges for operating temperature (-4°F to 158°F, -20°C to 70°C) and humidity (0% to 95% non-condensing).
- Patented sampling tube installs from front or back of the detector with no tools required.
- Cover tamper signal.
- Increased wiring space with a newly added 3/4” conduit knockout.
- Available space within housing to accommodate mounting of a relay module.
- Easily accessible code wheels on sensor head (sold separately).
- Clear cover for convenient visual inspection.
- Remote testing capability.
- Requires com line power only.
- Accommodates the installation of an addressable relay module, sold separately, (FRM-1 or NC-100R) for applications requiring a Form-C relay.



Specifications

Size: (Rectangle) 14.38 in (37 cm) Length; 5 in (12.7 cm) Width, 2.5 in (6.6 cm) Depth.

Size: (Square) 7.75 in (19.7 cm) Length; 9 in (22.9 cm) Width; 2.5 in (6.35 cm) Depth.

Weight: 1.6 lb (0.73 kg).

Operating Temperature Range: -4°F to 158°F (-20°C to 70°C).

Storage Temperature Range: -22°F to 158°F (-30°C to 70°C).

Operating Humidity Range: 0% to 95% relative humidity (non-condensing).

Air Duct Velocity: 100 to 4,000 ft/min (0.5 to 20.32 m/s).

Accessories

Notifier provides system flexibility with a variety of accessories, including two remote test stations and different means of visible and audible system annunciation. As with our duct smoke detectors, all duct smoke detectors accessories are UL listed.

DNR(W)s with a date code of 0013 or higher do not require external 24VDC for remote test applications when used with a remote-test-capable detector.

ACCESSORY CURRENT LOADS AT 24 VDC

Device	Standby	Alarm
RA100Z	0mA	12 mA Max
RTS151/ RTS151KEY	0mA	12mA Max

Agency Listings and Approvals

Consult product manual for lists of compatible UL-Listed devices. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL:** S911, S3705.
- **ULC:** S635.

- **CSFM:** 3242-1653:0209.
- **FM approved.**

Product Line Information

***NOTE:** "A suffix indicates ULC listed model.*

DNR(A): Intelligent non-relay photoelectric low flow smoke detector housing. Requires photoelectric smoke detector (sold separately).

DNRW: Watertight intelligent non-relay photoelectric low flow duct smoke detector housing. Requires photoelectric smoke detector (sold separately).

FSP-851R(A): Remote test capable addressable low-profile photoelectric smoke detector.

FSP-851(A): Addressable low-profile photoelectric smoke detector.

NP-100: Addressable low-profile photoelectric smoke detector for FireWarden series panels.

NP-100R(A): Remote test capable addressable low-profile photoelectric smoke detector for FireWarden series panels.

DCOIL: Remote test coil. Required for older DNR(W) duct detector housing.

DST1(A): Metal sampling tube duct width up to 1 ft (0.3m).

DST1.5(A): Metal sampling tube duct widths up to 1 ft to 2 ft (0.3 to 0.6 m).

DST3(A): Metal sampling tube duct widths up to 2 ft to 4 ft (0.6 to 1.2 m).

DST5(A): Metal sampling tube duct widths up to 4 ft to 8 ft (1.2 to 2.4 m).

DST10(A): Metal sampling tube duct widths up to 8 ft to 12 ft (2.4 to 3.7 m).

DH400OE-1: Weatherproof enclosure.

ETX: Metal exhaust tube duct, width 1 ft (0.3 m).

M02-04-00: Test magnet.

P48-21-00: End cap for metal sampling tubes.

RA100Z(A): Remote annunciator alarm LED.

RTS151(A): Remote test station.

RTS151KEY(A): Remote test station with key lock.

Important Note

- DNRW duct detector housings with a date code of 0013 or higher do not require a DCOIL or auxiliary 24 VDC for remote test applications when used with a remote test capable detector.
- DNRW duct detector housings with a date code of 0012 or earlier require a DCOIL and auxiliary 24 VDC power for remote test applications.

This document is not intended to be used for installation purposes.
We try to keep our product information up-to-date and accurate.
We cannot cover all specific applications or anticipate all requirements.
All specifications are subject to change without notice.

Made in the U.S. A.

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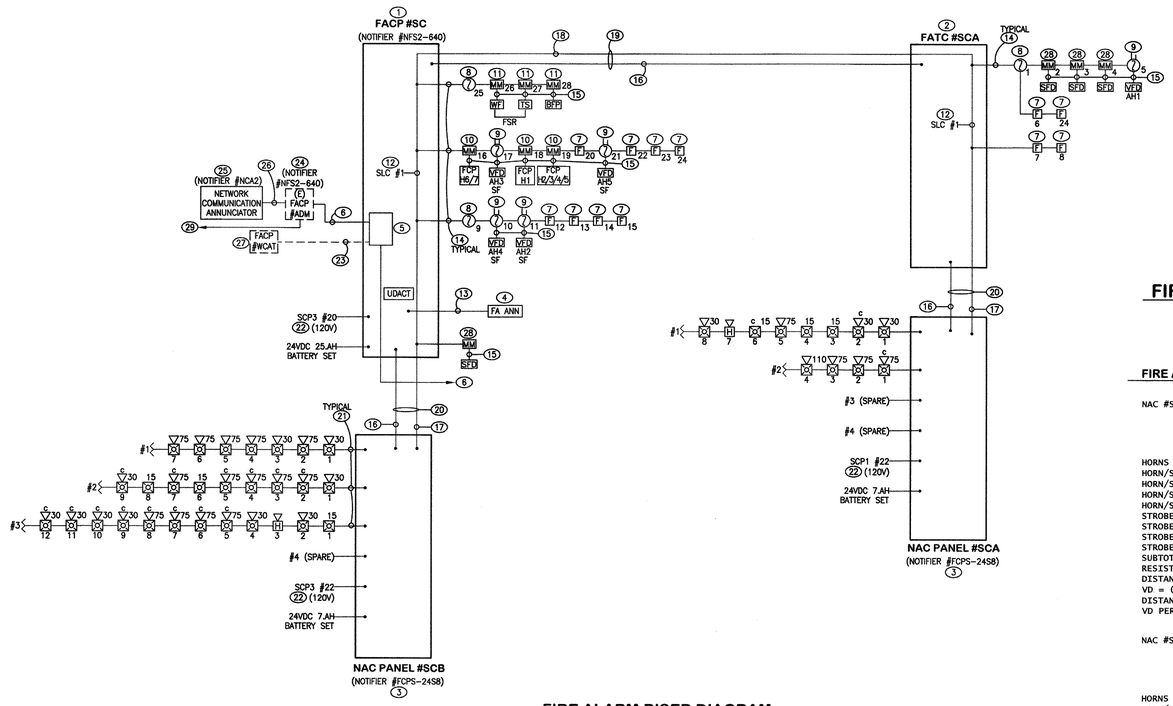
Appendix C: Fire Alarm Project Sheets



FIRE ALARM RISER DIAGRAM

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STUDENT CENTER FIRE ALARM RISER DIAGRAM NOTES:

1. FACP AND NAC POWER EXTENDER PANELS SHALL BE AS SPECIFIED TO MATCH EXISTING ON CAMPUS FOR NETWORKING.
2. FATC SHALL BE 12"X18"X6"D TERMINAL CABINET WITH FULL 3/4" PLYWOOD INSIDE WITH TERMINAL STRIPS FOR FIRE ALARM WIRING.
3. NAC POWER EXTENDER PANEL SHALL BE AS SPECIFIED TO MATCH EXISTING.
4. LOCAL FIRE ALARM ANNUNCIATOR PANEL.
5. FACP SHALL HAVE FIBER OPTIC NETWORK CARD.
6. 6-STRAND FIBER OPTIC CABLE TO EXISTING FACP #ADM IN ADMIN BLDG.
7. TYPICAL: ADDRESSABLE MANUAL PULL STATION.
8. TYPICAL: ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR WITH DETECTOR BASE.
9. TYPICAL: DUCT SMOKE DETECTOR WITH HOUSING AND SAMPLING TUBES IN AH UNIT SUPPLY AIR PLENUM. PROVIDE REMOTE LED INDICATOR LIGHT AND TEST SWITCH. RUN 1/2"C WITH 2#14 TO AH UNIT VFD FOR EMERGENCY SHUT DOWN CONTROL.
10. ADDRESSABLE MONITOR MODULE WITH CONNECTION TO KITCHEN HOOD FIRE CONTROL PANEL.
11. ADDRESSABLE MONITOR MODULE WITH CONNECTION TO FSR AND PIV.
12. SIGNAL LINE CIRCUIT (SLC) #1. FACP SHALL HAVE PROVISION FOR SECOND SLC CIRCUIT.
13. ONE "A" CABLE + 2#12 (24VDC).
14. TYPICAL: ONE "A" CABLE + 2#12 (24VDC) FOR SLC ADDRESSABLE DEVICES.
15. 2#14.
16. 2#12 (24VDC).
17. ONE "A" CABLE.
18. ONE "B" (UNDERGROUND WET LOCATION LISTED) + 2#12.
19. ONE 1-1/2"C WITH ONE "B" CABLE + 2#12 (24VDC). ONE 1-1/2"C SPARE.
20. ONE 1-1/4"C WITH ONE "A" CABLE + 2#12 (24VDC).
21. TYPICAL: 2#12 FOR STROBES AND HORNS.
22. BREAKERS IN PANEL SHALL BE "RED" WITH LOCK-ON DEVICE AT HANDLE. PROVIDE NAMEPLATE: "FIRE ALARM. LEAVE ON".
23. ONE 6-STRAND MULTI-MODE FIBER OPTIC CABLE TO FACP #WCAT PER OVERALL SITE ELECTRICAL PLAN FOR NETWORKING OF CAMPUS FIRE ALARM PANELS.
24. PROVIDE NEW NOTIFIER #NFS2-640 FIRE ALARM CONTROL PANEL TO REPLACE EXISTING #NFS-640 PANEL IN EXISTING ADMIN BLDG BASEMENT. SUPPLIER SHALL PROVIDE ALL WORK, INCLUDING BUT NOT LIMITED TO, PROGRAMING, TESTING, STARTUP, ETC. AS REQUIRED FOR A COMPLETE OPERABLE FIRE ALARM NETWORKING SYSTEM. NEW FACP SHALL HAVE MINIMUM 25AH BATTERY SET.
25. REPLACE EXISTING LOCAL ANNUNCIATOR PANEL WITH NEW NETWORK COMMUNICATION ANNUNCIATOR PANEL.
26. REUSE EXISTING CABLE TO CONNECT NEW ANNUNCIATOR PANEL TO UPGRADED FACP.
27. FACP #WCAT SHALL BE PROVIDED IN FUTURE WITH THE RESIDENCE HALL MODERNIZATION PROJECT.
28. ADDRESSABLE MONITOR MODULE WITH CONNECTION TO SMOKE FIRE DAMPER FOR MONITORING OF INTEGRAL DUCT SMOKE DETECTOR IN SMOKE FIRE DAMPER.
29. TWO EXISTING DEDICATED TEL LINES PROVIDED BY DISTRICT FOR REMOTE MONITORING, TO REMAIN.

FIRE ALARM SYSTEM BATTERY LOAD CALCULATION

(NOTIFIER #NFS2-640)

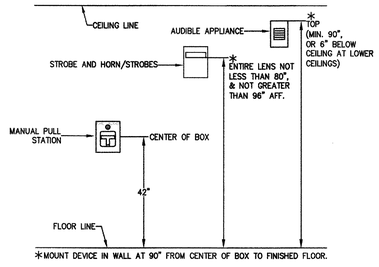
	QUAN.	STANDBY CURRENT AMPS EACH	STANDBY CURRENT AMPS SUBTOTAL	ALARM CURRENT AMPS EACH	ALARM CURRENT AMPS SUBTOTAL
FACP (NOTIFIER #NFS2-640)	1	0.2300	0.230	0.2300	0.230
PRIMARY DISPLAY	1	0.0400	0.040	0.0400	0.040
NETWORK CONTROL MODULE	1	0.1100	0.110	0.1100	0.110
DACT	1	0.0400	0.040	0.1000	0.100
REMOTE ANNUNCIATOR PANEL (LCD-80TM)	1	0.0500	0.050	0.1000	0.100
MONITOR MODULE	8	0.0003	0.002	0.0002	0.002
MANUAL PULL STATION	10	0.0003	0.003	0.0003	0.003
SMOKE DETECTORS	2	0.0003	0.001	0.0070	0.014
DUCT SMOKE DETECTORS	5	0.0260	0.130	0.0970	0.485
SUBTOTAL			0.606		1.084
STANDBY CURRENT X 24HRS			14.544		
ALARM CURRENT X 5 MINUTES			0.091		
TOTAL BATTERY AMP-HOURS REQUIRED			14.635		
STANDBY BATTERY PROVIDED			25.0 AH		

NAC PANEL #SCA
(NOTIFIER #FCPS-24S8)

	QUAN	STANDBY CURRENT AMPS EACH	STANDBY CURRENT AMPS SUBTOTAL	ALARM CURRENT AMPS EACH	ALARM CURRENT AMPS SUBTOTAL
NAC PANEL (FCPS #24S8)	1	0.080	0.080	0.240	0.240
HORNS	1			0.075	0.075
HORN/STROBE 15CD	0			0.079	0.000
HORN/STROBE 30CD	3			0.107	0.321
HORN/STROBE 75CD	3			0.176	0.528
HORN/STROBE 110CD	1			0.212	0.212
STROBE 15CD	3			0.071	0.213
STROBE 30CD	0			0.096	0.000
STROBE 75CD	0			0.153	0.000
STROBE 110CD	0			0.195	0.000
STROBE 135CD	0			0.207	0.000
SUBTOTAL			0.080		1.589
STANDBY CURRENT X 24HRS			1.920		
ALARM CURRENT X 5 MINUTES			0.133		
TOTAL BATTERY AH REQUIRED			2.053		
STANDBY BATTERY (AMP-HR)			7.0		

NAC PANEL #SCB
(NOTIFIER #FCPS-24S8)

	QUAN	STANDBY CURRENT AMPS EACH	STANDBY CURRENT AMPS SUBTOTAL	ALARM CURRENT AMPS EACH	ALARM CURRENT AMPS SUBTOTAL
NAC PANEL (FCPS #24S8)	1	0.080	0.080	0.240	0.240
HORNS	1			0.075	0.075
HORN/STROBE 15CD	0			0.079	0.000
HORN/STROBE 30CD	10			0.107	1.070
HORN/STROBE 75CD	14			0.176	2.464
HORN/STROBE 110CD	0			0.212	0.000
STROBE 15CD	3			0.071	0.213
STROBE 30CD	0			0.096	0.000
STROBE 75CD	0			0.153	0.000
STROBE 110CD	0			0.195	0.000
STROBE 135CD	0			0.207	0.000
SUBTOTAL			0.080		4.062
STANDBY CURRENT X 24HRS			1.920		
ALARM CURRENT X 5 MINUTES			0.338		
TOTAL BATTERY AH REQUIRED			2.259		
STANDBY BATTERY (AMP-HR)			7.0		



FIRE ALARM DEVICES WALL MOUNTING DETAIL

NTS

FIRE ALARM SYSTEM VOLTAGE DROP CALCULATION:

NAC #SCA-1

	QUAN.	ALARM CURRENT AMPS EACH	SUBTOTAL
HORNS	1	0.075	0.075
HORN/STROBE 15CD	0	0.079	0.000
HORN/STROBE 30CD	3	0.107	0.321
HORN/STROBE 75CD	1	0.176	0.176
HORN/STROBE 110CD	0	0.212	0.000
STROBE 15CD	3	0.071	0.213
STROBE 30CD	0	0.096	0.000
STROBE 75CD	0	0.153	0.000
STROBE 110CD	0	0.195	0.000
SUBTOTAL			0.785
RESISTANCE FOR #12 AWG PER 1000-FT			2.010
DISTANCE OF LAST DEVICE FROM PANEL			160
VD = (LOAD X 2.01 X 2 X DISTANCE)/1000			0.505
VD PERCENTAGE AT 24V			2.104

NAC #SCA-2

	QUAN.	ALARM CURRENT AMPS EACH	SUBTOTAL
HORNS	1	0.075	0.075
HORN/STROBE 15CD	0	0.079	0.000
HORN/STROBE 30CD	0	0.107	0.000
HORN/STROBE 75CD	3	0.176	0.528
HORN/STROBE 110CD	1	0.212	0.212
STROBE 15CD	0	0.071	0.000
STROBE 30CD	0	0.096	0.000
STROBE 75CD	0	0.153	0.000
STROBE 110CD	0	0.195	0.000
SUBTOTAL			0.815
RESISTANCE FOR #12 AWG PER 1000-FT			2.010
DISTANCE OF LAST DEVICE FROM PANEL			170
VD = (LOAD X 2.01 X 2 X DISTANCE)/1000			0.557
VD PERCENTAGE AT 24V			2.321

FIRE ALARM SYSTEM VOLTAGE DROP CALCULATION:

NAC #SCB-1

	QUAN.	ALARM CURRENT AMPS EACH	SUBTOTAL
HORNS	0	0.075	0.000
HORN/STROBE 15CD	0	0.079	0.000
HORN/STROBE 30CD	2	0.107	0.214
HORN/STROBE 75CD	5	0.176	0.880
HORN/STROBE 110CD	0	0.212	0.000
STROBE 15CD	0	0.071	0.000
STROBE 30CD	0	0.096	0.000
STROBE 75CD	0	0.153	0.000
STROBE 110CD	0	0.195	0.000
SUBTOTAL			1.094
RESISTANCE FOR #12 AWG PER 1000-FT			2.010
DISTANCE OF LAST DEVICE FROM PANEL			345
VD = (LOAD X 2.01 X 2 X DISTANCE)/1000			1.517
VD PERCENTAGE AT 24V			6.322

NAC #SCB-2

	QUAN.	ALARM CURRENT AMPS EACH	SUBTOTAL
HORNS	0	0.075	0.000
HORN/STROBE 15CD	0	0.079	0.000
HORN/STROBE 30CD	2	0.107	0.214
HORN/STROBE 75CD	5	0.176	0.880
HORN/STROBE 110CD	0	0.212	0.000
STROBE 15CD	2	0.071	0.142
STROBE 30CD	0	0.096	0.000
STROBE 75CD	0	0.153	0.000
STROBE 110CD	0	0.195	0.000
SUBTOTAL			1.236
RESISTANCE FOR #12 AWG PER 1000-FT			2.010
DISTANCE OF LAST DEVICE FROM PANEL			190
VD = (LOAD X 2.01 X 2 X DISTANCE)/1000			0.944
VD PERCENTAGE AT 24V			3.934

NAC #SCB-3

	QUAN.	ALARM CURRENT AMPS EACH	SUBTOTAL
HORNS	1	0.075	0.075
HORN/STROBE 15CD	0	0.079	0.000
HORN/STROBE 30CD	6	0.107	0.642
HORN/STROBE 75CD	4	0.176	0.704
HORN/STROBE 110CD	0	0.212	0.000
STROBE 15CD	1	0.071	0.071
STROBE 30CD	0	0.096	0.000
STROBE 75CD	0	0.153	0.000
STROBE 110CD	0	0.195	0.000
SUBTOTAL			1.492
RESISTANCE FOR #12 AWG PER 1000-FT			2.010
DISTANCE OF LAST DEVICE FROM PANEL			315
VD = (LOAD X 2.01 X 2 X DISTANCE)/1000			1.890
VD PERCENTAGE AT 24V			7.872

FIRE ALARM SYSTEM OPERATIONAL MATRIX					
DEVICE	ACTIVATE EVACUATION SIGNALS/STROBES	SHUTDOWN ASSOCIATED FAN	SEND SIGNAL TO CENTRAL STATION	SUPERVISORY	TROUBLE
FIRE ALARM PANEL SYSTEM TROUBLE			X		
MANUAL PULL STATION	X		X		
SMOKE DETECTOR	X		X		
HEAT DETECTOR	X		X		
DUCT SMOKE DETECTOR	X	X	X	X	
WATER FLOW SWITCH			X		
VALVE TAMPER SWITCH			X		X
AC POWER FAILURE			X		X
BATTERY LOSS			X		X
PIV			X		X
ANSUL SYSTEMS			X	X	X

FIRE ALARM GENERAL NOTES:

1. AFTER "AIR BALANCING" HAS BEEN SUCCESSFULLY COMPLETED, TEST ALL FIRE ALARM DEVICES AND APPLIANCES. DO NOT USE A MAGNET TO TEST SMOKE DETECTORS. AFTER SUCCESSFUL TESTING OF THE FIRE ALARM SYSTEM, COMPLETE THE NFPA 72 RECORD OF COMPLETION PROVIDING COPIES TO THE ARCHITECT, OWNER (SCHOOL DISTRICT), LOCAL FIRE AUTHORITY AND DSA (VIA THE PROJECT INSPECTOR).
2. UNDERGROUND AND EXTERIOR CONDUITS SHALL HAVE WATER-TIGHT FITTINGS, (CEC 110-11 AND 300-6). ALL FIRE ALARM WIRING SHALL BE LISTED FOR USE PER TITLE 24 AND CEC ARTICLE 760. ALL FIRE ALARM WIRING SHALL BE STRANDED TYPE WIRES. UNLESS OTHERWISE NOTED, WIRING FOR ADDRESSABLE INITIATION DEVICES AND ADDRESSABLE ANALOG LOOP CABLE SHALL BE WEST PENN #0990 IN DRY LOCATION AND #AQ225 UL LISTED FOR WET LOCATION AND UNDERGROUND CONDUIT RUNS. WIRING FOR SIGNAL DEVICES SHALL BE #12 (THHN/THWN, COPPER). WIRING SHALL BE "THWN" COPPER OR EQUAL IN WET LOCATIONS.
3. AUDIBLE DEVICES SHALL BE AT LEAST 15DBA ABOVE AVERAGE AMBIENT SOUND LEVEL BUT NOT LESS THAN 75 DBA AT 10-FEET OR MORE THAN 110 DBA IN TOTAL, THROUGHOUT. (NFPA 72, 2010, CH.7.4).
4. AUDIBLE SIGNAL SHALL BE THE STANDARD FIRE ALARM EVACUATION SIGNAL. ANSI S34.1. AUDIBLE EMERGENCY EVACUATION SIGNAL, "THREE PULSE TEMPORAL PATTERN," AS DESCRIBED IN NFPA 72, 2010. (CFC 2010, 907.10.2).
5. PROVIDE AT LEAST ONE EXTERIOR HORN ON BUILDINGS FOR E OCCUPANCIES (CFC 2010, SECTION 907.2.3.3).
6. VISUAL DEVICES SHALL NOT EXCEED 2 FLASHES PER SECOND AND SHALL NOT BE SLOWER THAN 1 FLASH EVERY SECOND (NFPA 72, 2010, CH.7.5).
7. FOR LARGER ROOM WITH MORE THAN TWO VISUAL DEVICES, ALL DEVICES SHALL BE SYNCHRONIZED.
8. FIRE ALARM SYSTEM SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION AS REQUIRED BY NFPA 72 AS AMENDED BY ARTICLE 91. THE SUPERVISING STATION SHALL BE LISTED AS EITHER UUFX OR UUJS BY UNDERWRITERS LABORATORY OR SHALL MEET THE REQUIREMENTS OF FACTORY MUTUAL RESEARCH APPROVAL STANDARD 3011. SUPERVISION OF SYSTEM AND TELEPHONE LINES SHALL BE ARRANGED BY DISTRICT.

GOVERNING CODES:

TITLE 19 CCR. PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.

TITLE 24 CODES:
TITLE 24 CCR, PART 1 – 2010 CALIFORNIA BUILDING STANDARD ADMINISTRATIVE CODE (CAC).
TITLE 24 CCR, PART 2 – 2010 CALIFORNIA BUILDING CODE (CBC), VOLUMES 1 AND 2 (2010 EDITION INTERNATIONAL BUILDING CODE AS AMENDED BY CA).
TITLE 24 CCR, PART 3 – 2010 CALIFORNIA ELECTRICAL CODE,(2008 EDITION NATIONAL ELECTRICAL CODE AS AMENDED BY CA).
TITLE 24 CCR, PART 4 – 2010 CALIFORNIA MECHANICAL CODE (CMC),(2009 EDITION IAPMO UNIFORM MECHANICAL CODE AS AMENDED BY CA).
TITLE 24 CCR, PART 5 – 2010 CALIFORNIA PLUMBING CODE (CPC), (2009 EDITION IAPMO UNIFORM PLUMBING CODE AS AMENDED BY CA).
TITLE 24 CCR, PART 6 – 2010 CALIFORNIA ENERGY CODE,(2008 EDITION CALIFORNIA ENERGY COMMISSION BUILDING ENERGY EFFICIENCY STANDARDS).
TITLE 24 CCR, PART 7 – 2010 CALIFORNIA ELEVATOR SAFETY CONSTRUCTION CODE.
TITLE 24 CCR, PART 8 – 2010 CALIFORNIA HISTORICAL BUILDING CODE.
TITLE 24 CCR, PART 9 – 2010 CALIFORNIA FIRE CODE (CFC),(2009 EDITION INTERNATIONAL FIRE CODE AS AMENDED BY CA).
TITLE 24 CCR, PART 10 – 2010 EXISTING BUILDING CODE.
TITLE 24 CCR, PART 12 – 2010 CALIFORNIA REFERENCE STANDARDS (2010 CBC, CHAPTER 35 AND 2010 CFC, CHAPTER 45).

REFERENCE CODE SECTIONS FOR APPLICABLE STANDARDS:
1. 2010 CBC, CHAPTER 35.
2. 2010 CFC, CHAPTER 45.
3. 2010 NFPA 72, AS AMENDED BY STATE OF CALIFORNIA.
4. 2010 NFPA 13, AS AMENDED BY STATE OF CALIFORNIA.

FIRE ALARM SYSTEM SPECIFICATION:

SYMBOL	DESCRIPTION	MANUFACTURER	CAT. NUMBER	CSFM LISTING
FACP	FACP	NOTIFIER	NFS2-640	7165-0028:0243
	UDACT	NOTIFIER	UDACT	7300-0028:0174
ANN	REMOTE ANN PANEL	NOTIFIER	FDU-80	7120-0028:0209
NANN	NETWORK ANN	NOTIFIER	NCA-2	7165-0028:0243
MM	REMOTE MONITOR MODULE	NOTIFIER	FDM-1	7300-0028:0219
CM	REMOTE CONTROL MODULE	NOTIFIER	FCM-1	7300-0028:0219
	PULL STATION	NOTIFIER	NBG-12LX	7150-0028:0199
	SMOKE DETECTOR	NOTIFIER	FSP-851	7272-0028:0206
	DETECTOR BASE	NOTIFIER	B710LP	7300-0028:0173
	DUCT SMOKE DETECTOR & RELAY	NOTIFIER	DNR	3242-1653:0209
NAC	NAC POWER EXTENDER PANEL	NOTIFIER	FCPS-24S8	7315-0028:0225
WP H	WP HORN	SYSTEM SENSOR	HRK, SA-WBB	7135-1653:0189
	AV HORN WITH MC STROBE	SYSTEM SENSOR	P2R	7125-1653:0188
C	AV HORN WITH MC STROBE, CLG	SYSTEM SENSOR	PC2R	7125-1653:0188
	VISUAL MC STROBE LIGHT	SYSTEM SENSOR	SR	7125-1653:0186
"A"	SLC CABLE, INTERIOR	WEST PENN	D990	7161-0859:0101
"B"	SLC CABLE, EXTERIOR	WEST PENN	AQC225	7161-0859:0101

FIRE ALARM SCOPE OF WORK:

1. PROVIDE AN ADDRESSABLE MANUAL FIRE ALARM SYSTEM WITH CLASS B STYLE 4 WIRING, FOR A GROUP B EDUCATION FACILITY PER CBC 907.2.2.2.
2. REPLACE EXISTING FIRE ALARM CONTROL PANEL AT ADMIN BUILDING WITH NEW, TO FORM A NEW FIRE ALARM NETWORKING SYSTEM ON CAMPUS, VIA FIBER OPTIC CABLE CONNECTION.

FIRE ALARM SYSTEM WIRING NOTES:

1. ADDRESSABLE SIGNAL LINE CIRCUIT CABLES RUN INSIDE BLDGS SHALL BE #16 TWISTED SHIELDED PAIRED FPL CABLE.
2. ADDRESSABLE SIGNAL LINE CIRCUIT CABLES RUN UNDERGROUND OR EXTERIOR OF BLDGS SHALL BE #16 TWISTED SHIELDED PAIRED FPL CABLE LISTED FOR WET LOCATION.
3. NAC CIRCUIT WIRING SHALL BE #12 THWN COPPER RUN IN CONDUIT.
4. FIRE ALARM JUNCTION BOXES AND CONDUITS SHALL BE PAINTED RED.

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p (559) 432-1147 - f (559) 432-1625

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
AC NN FLS 2 SS DO
DATE SEP 16 2015

PROJECT INFO

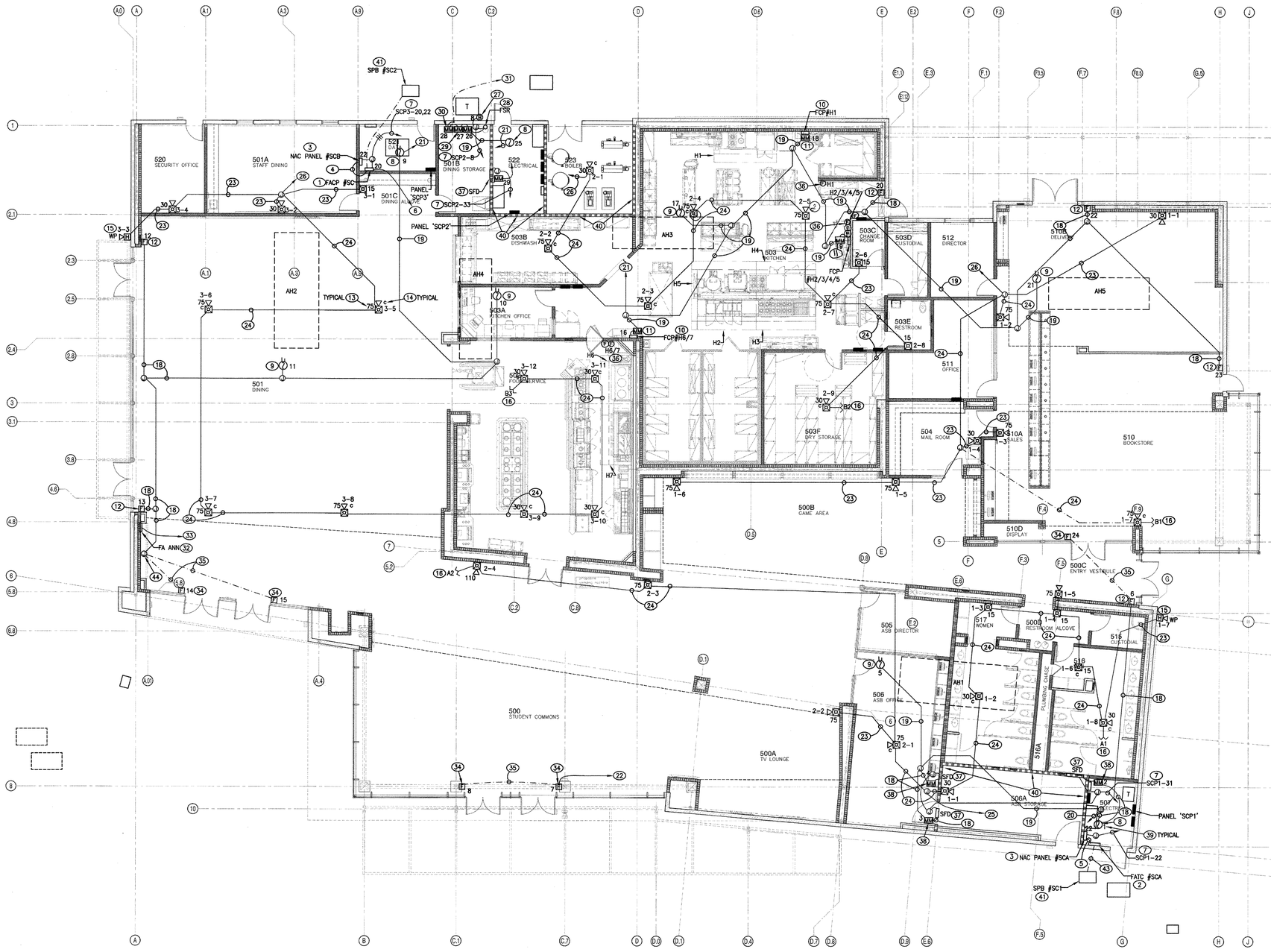
Project No	430-0044
Drawn By	*
Checked By	*
Date	09.01.2015

REVISIONS

No	Date	Item

FIRE ALARM RISER DIAGRAM, DETAILS

E3.30



Fire Alarm Plan

1/8" = 1'-0"

FIRE ALARM PLAN NOTES:

1. PROVIDE NEW FACP AS SPECIFIED TO MATCH EXISTING ON CAMPUS FOR NETWORKING.
2. FATC SHALL BE 18"X24"X6"D TERMINAL CABINET WITH FULL 3/4" PLYWOOD INSIDE WITH TERMINAL STRIPS FOR FIRE ALARM WIRING.
3. PROVIDE NAC POWER EXTENDER PANEL AS SPECIFIED TO MATCH EXISTING.
4. RUN FROM FACP TO NAC PANEL: ONE 1"C WITH ONE "A" CABLE + 2#12 (24VDC).
5. RUN FROM FATC TO NAC PANEL: ONE 1"C WITH ONE "A" CABLE + 2#12 (24VDC).
6. RUN FROM FACP TO FATC #SCA: ONE 1-1/4"C IN ATTIC WITH ONE "A" CABLE + 2#21. VERIFY ROUTING IN FIELD. PROVIDE PULL BOXES IN ACCESSIBLE ATTIC AS REQUIRED.
7. BREAKERS IN PANEL SHALL BE "RED" WITH LOCK-ON DEVICE AT HANDLE. PROVIDE NAMEPLATE: "FIRE ALARM. LEAVE ON".
8. TYPICAL: DENOTES ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR WITH BASE. MOUNT ON CEILING.
9. PROVIDE SYSTEM TYPE ADDRESSABLE DUCT SMOKE DETECTOR WITH HOUSING AND SAMPLING TUBES IN AH UNIT SUPPLY AIR PLENUM AT LOCATION AS DIRECTED BY MECHANICAL ENGINEER. PROVIDE REMOTE LED INDICATOR LIGHT AND TEST SWITCH ON CEILING WITH 1/2"C WITH 5#14 TO DETECTOR. RUN 1/2"C WITH 2#14 TO RESPECTIVE AH UNIT VFD FOR EMERGENCY SHUT DOWN CONTROL. CONNECT AS DIRECTED BY CONTROL CONTRACTOR.
10. HOOD FIRE CONTROL PANEL FOR THE ANUSL FIRE SUPPRESSION SYSTEM SHALL BE PROVIDED BY KITCHEN CONTRACTOR.
11. PROVIDE ADDRESSABLE MONITOR MODULE IN ACCESSIBLE ATTIC. RUN 1/2"C WITH 2#14 FIRE CONTROL PANEL FOR MONITORING OF ANSUL SYSTEM ALARM BY FACP.
12. TYPICAL: ADDRESSABLE FIRE ALARM PULL STATION.
13. TYPICAL: DENOTES FIRE ALARM COMBINATION HORN/MULTI-CANDELA STROBE.
14. TYPICAL: "C" DENOTES CEILING MOUNTED DEVICES.
15. PROVIDE WEATHERPROOF HORN IN WEATHERPROOF BACKBOX ON EXTERIOR WALL. SEAL CONDUIT PENETRATION THROUGH EXTERIOR WALL WATER-TIGHT.
16. DENOTES "END-OF-LINE" RESISTOR FOR RESPECTIVE NAC CIRCUIT.
17. TYPICAL: LOCATE JUNCTION BOXES IN ACCESSIBLE ATTIC FOR FIRE ALARM WIRING. BOXES SHALL BE PAINTED "RED" WITH "FA" NAMEPLATE ON BOX COVER.
18. 3/4"C WITH ONE "A" CABLE.
19. 3/4"C WITH ONE "A" CABLE + 2#12 (24VDC).
20. 1"C WITH ONE "A" CABLE + 2#12 (24VDC) TO FACP.
21. 1"C WITH ONE "A" CABLE + 2#12 (24VDC) TO FATC.
22. 1"C WITH ONE "A" CABLE RUN IN ATTIC TO FACP.
23. 3/4"C WITH 4#12 (NAC).
24. 3/4"C WITH 2#12 (NAC).
25. 1"C WITH 4#12 (2 NAC) TO NAC PANEL #SCA.
26. 1"C WITH 2#12 (NAC) TO NAC PANEL #SCB.
27. CONNECT 120V ALARM BELL. RUN 1/2"C WITH 2#12 + 1#12 GROUND FROM ALARM BELL TO WATERFLOW SWITCH AT FSR FOR CONTROL.
28. VERIFY CONNECTION REQUIREMENT OF FSR WITH SUPPLIER.
29. PROVIDE ADDRESSABLE MONITOR MODULES IN OUTLET BOXES AND CONNECTION TO TAMPER SWITCH AND WATERFLOW SWITCH AT FSR.
30. PROVIDE ADDRESSABLE MONITOR MODULES IN OUTLET BOXES FOR TAMPER SWITCHES AT SITE ASR CONNECTION.
31. RUN 3/4"C WITH 4#14 TO BACKFLOW PREVENTER AT SITE ASR CONNECTION. SEE PARTIAL SITE ELECTRICAL PLAN #2 FOR CONTINUATION. CONNECT TAMPER SWITCHES.
32. PROVIDE LOCAL FIRE ALARM ANNUNCIATOR PANEL. FLUSH MOUNT IN WALL. VERIFY LOCATION WITH ARCHITECT.
33. RUN 1-1/4"C WITH 2#12 (24VDC) AND ONE "A" CABLE IN ATTIC TO FACP.
34. PROVIDE ADDRESSABLE FIRE ALARM PULL STATION AT STORE FRONT. MOUNT PULL STATION IN SURFACE 1-GANG WIREMOLD BOX OVER MULLION. RUN FIRE ALARM CABLE INSIDE MULLION.
35. 1/2"C WITH ONE "B" WET LOCATION LISTED CABLE. RUN UNDERGROUND.
36. MECHANICAL FIRE PULL STATION FOR ACTIVATION OF KITCHEN HOOD ANSUL FIRE SUPPRESSION SHALL BE FURNISHED AND INSTALLED BY KITCHEN EQUIPMENT CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE BACKBOX AND CONDUIT UP INTO ACCESSIBLE ATTIC. PULL STATIONS SHOWN FOR REFERENCE ONLY. PROVIDE ONE PULL STATION PER HOOD. TYPICAL OF 1 PULL STATIONS.
37. PROVIDE 120V CONNECTION FOR SMOKE FIRE DAMPER WITH INTEGRAL DUCT SMOKE DETECTOR. VERIFY CONNECTION LOCATION AND REQUIREMENT IN FIELD.
38. PROVIDE ADDRESSABLE MONITOR MODULE IN ATTIC. RUN 1/2"C WITH 2#14 TO SMOKE FIRE DAMPER FOR MONITORING OF THE INTEGRAL DUCT SMOKE DETECTOR. CONNECT AS DIRECTED BY DAMPER SUPPLIER.
39. TYPICAL: "1" AT INITIATION DEVICES DENOTES ADDRESSABLE DEVICE ADDRESS NUMBER FOR REFERENCE ONLY. DEVICE ADDRESS AND DESCRIPTION SHALL BE PROGRAMMED BY FIRE ALARM SYSTEM SUPPLIER, AS DIRECTED BY DISTRICT.
40. REFER TO WALL LEGEND ON A2.20 FOR LOCATION AND DESCRIPTION OF RATED WALLS. REFER TO DETAIL #14/E3.11 FOR PENETRATION REQUIREMENT.
41. REFER TO SITE ELECTRICAL PLAN E1.22 FOR LOCATION OF SIGNAL PULL BOXES.
42. RUN FROM FACP TO SPB #SC2: ONE 2"C WITH 6-STRAND FO CABLE FROM ADMIN FACP; ONE 2"C WITH PULL WIRE FOR FUTURE 6-STRAND FO CABLE TO FUTURE DORM FACP #WCAT; ONE 2"C SPARE.
43. RUN FROM FATC TO SPB #SCA: TWO 1-1/2"C SPARE.
44. PROVIDE JUNCTION BOX AT RECEPTACLE HEIGHT FLUSH IN WALL WITH 1-GANG STAINLESS STEEL BLANK COVER.

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STUDENT CENTER

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2900 Emmons Park Drive,Taft,CA.93268
West Kern Community College District

DSA SET

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KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

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REVISIONS

No	Date	Item

FIRE ALARM PLAN

E2.13

Appendix D: Architectural Sheets

STUDENT CENTER

Taft College
West Kern Community College District

SHEET INDEX

GENERAL NOTES

1. PLAN DIMENSIONS SHOWN FOR NEW CONSTRUCTION ARE TAKEN TO FACE OF STUD (FOS), FACE OF CONCRETE (FOC) OR FACE OF MASONRY (FOM) EXCEPT DIMENSIONS NOTED FACE OF FINISH (FOF). WHERE A CLEAR DIMENSION (CLR) IS NOTED, IT SHALL MEAN DISTANCE BETWEEN DIMENSION ENDS SHALL BE CLEAR BETWEEN.
2. HEIGHTS SHOWN OR NOTED AFF (ABOVE FINISH FLOOR) ARE TO BE MEASURED FROM TOP OF FINISH FLOORING MATERIAL. EXCEPTION: AT AREAS THAT RECEIVE COATINGS, CARPET OR RESILIENT FLOORING, HEIGHTS ARE TO BE MEASURED FROM TOP OF CONCRETE SLAB.
3. DO NOT SCALE DRAWINGS. IF UNABLE TO LOCATE DIMENSIONS FOR ANY ITEM OF WORK, CONSULT ARCHITECT FOR DIRECTION BEFORE PROCEEDING.
4. IF DRAWINGS MEASURE LESS THAN 30"x42", PRINTS ARE REDUCED FROM ORIGINALS.
5. DETAILS AND KEYNOTES SHOWN ON CONSTRUCTION DOCUMENTS SHALL BE INCORPORATED INTO THE PROJECT AT ALL APPROPRIATE LOCATIONS WHETHER SPECIFICALLY REFERENCED AT EACH LOCATION OR NOT.
6. ADJUNCT CONSTRUCTION-THE EMBEDMENT OR PASSAGE OF PIPING, ELECTRICAL CONDUIT, DUCTWORK AND OTHER MATERIALS THAT WOULD REDUCE THE STRENGTH OF MASONRY OR CONCRETE WALLS OR FOOTINGS OR FRAMING IS NOT PERMITTED UNLESS THE WORK IS DONE IN ACCORDANCE WITH THE STANDARD DETAILS SHOWN ON THE DRAWINGS. THIS WORK MUST BE APPROVED BY THE PROJECT INSPECTOR PRIOR TO CLOSING IN OR CASTING. SEE STANDARD DETAILS AND PROJECT MANUAL FOR THE RELATIONSHIP OF UNDERGROUND CONDUIT AND PIPING TO FOUNDATIONS, FOR OPENINGS, FOR PIPING IN WALLS AND OTHER SPECIAL CONDITIONS DESIGNED FOR THIS PROJECT.
7. WHERE PLAN NOTES CALL FOR THE CONTRACTORS TO INSTALL SPECIAL ITEMS IT IS TO BE EXPLICITLY UNDERSTOOD THAT THE CONTRACTOR IS TO ALSO PROVIDE THAT ITEM AND ALL ACCESSORY EQUIPMENT TO INSTALL THAT ITEM. IF ITEM IS TO BE PROVIDED BY OWNER IT WILL BE SO INDICATED.
8. THE EXISTING PLANS OF THE CAMPUS ARE ON FILE AT THE MAINTENANCE DEPT. THE BIDDERS SHALL REVIEW PLANS DURING NORMAL WORKING HOURS PRIOR TO SUBMITTING A BID PROPOSAL.
9. CONTRACTOR SHALL REPAIR ALL CONSTRUCTION DAMAGE NOT LIMITED TO LANDSCAPE AREAS, HARDSCAPE AREAS AND OTHER ITEMS TO PRECONSTRUCTION CONDITION FROM DAMAGE DURING CONSTRUCTION. PROVIDE PHOTOGRAPHS PRIOR TO STARTING WORK TO PROJECT INSPECTOR, SEE PROJECT MANUAL.
10. IN WORK AREAS, CONTRACTOR SHALL FIELD VERIFY ALL EX UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION CONTACT ALL UTILITY COMPANIES FOR VERIFICATION OF ALL UNDERGROUND UTILITIES. EXISTING PLANS ARE ON FILE AT MAINTENANCE DEPARTMENT, REVIEW DRAWINGS PRIOR TO BIDDING.
    a. REVIEW UG UTILITY PLANS ON FILE AT MAINTENANCE DEPT.
    b. REVIEW ABOVE GRADE UTILITY RELATED ITEMS, EX YARD BOXES, METERS, PIPES THAT CORRESPOND TO UG UTILITY DRAWINGS.
    c. CONSULT WITH MAINTENANCE DEPT. PRIOR TO TRENCHING IDENTIFY LAYOUT TRENCH PATH, WALK TRENCH PATH WITH MAINTENANCE DEBT. PRIOR TO TRENCHING.
    d. CONTRACTOR TO POT HOLE UTILITY LINE INTERSECTIONS PRIOR TO TRENCHING ALLOW FOR ±10 FEET.
11. ALL BURIED STEEL PIPE AND FERROUS METAL OBJECTS SHALL BE PROVIDED WITH A PROTECTIVE COATING, SEE PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.
12. PRELIMINARY SOILS INVESTIGATION, REFER TO PROJECT MANUAL.
13. THE ELECTRICAL, PLUMBING, AND MECHANICAL DRAWINGS ARE DIAGRAMMATIC ONLY DO NOT SCALE THE DRAWINGS TO DETERMINE THE LOCATION OF EXISTING EQUIPMENT, OUTLETS, OR OTHER ITEMS.
14. SEE ACCESSORY SCHEDULE, DETAILS AND INTERIOR ELEVATIONS FOR MOUNTING HEIGHTS OF ACCESSORIES.
15. MAINTAIN FIRE RESISTANCE RATING OF ONE HOUR RATED ASSEMBLIES BEHIND RECESSED WALL ACCESSORIES INCLUDING FIRE EXTINGUISHER CABINETS, TOILET ACCESSORIES, MISC. ACCESSORIES, ELECTRICAL JUNCTION BOXES AND OTHER ITEMS WHERE OCCURRING.

17-01-19M

ABBREVIATIONS (PARTIAL LIST)

AB	ANCHOR BOLT
AC	ASPHALT CONCRETE, AIR CONDITIONING
ACC	ACCESS CONTROL
ACOUS	ACOUSTICAL
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
AGG	AGGREGATE
ALT	ALTERNATE
ALUM	ALUMINUM
ANOD	ANODIZED
APRROX	APPROXIMATE
ARCH	ARCHITECT (URAL)
AS	ADJUSTABLE SHELF(S)
B	BLANK CABINET PANEL
BD	BOARD
BLK	BLOCK
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BOT	BOTTOM
BUR	BUILT UP ROOF(ING)
CAB	CABINET
CEM	CEMENT
CI	CAST IRON
CJ	CONTROL JOINT
CJF	CONTROL/CONSTRUCTION JOINT FILLED
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR(ANCE)/COLOR
CMU	CONCRETE MASONRY UNIT
CNTR	COUNTER
CO	CLEAN OUT
COB	CITY OF BAKERSFIELD
COC	CITY OF COALINGA
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUOUS OR CONTINUE
COP	CONTROL OPERATIONS PANEL
CPT	CARPET(ED)
CR	CARD READER
CSVB	COVED SHEET VINYL BASE
CTSK	COUNTER SINK
CU	CONDENSER UNIT
d	PENNY (NAILS)
D	DRAWER
DBL	DOUBLE
DEMO	DEMOLITION
DET	DETAIL
DF	DRINKING FOUNTAIN
DG	DECOMPOSED GRANITE
DIA	DIAMETER
DIM	DIMENSION
DIS	DISABLED
DL	DEAD LOAD
DN	DOWN
DS	DOWN SPOUT
DTR	DUCT THRU ROOF
DWG(S)	DRAWING(S)
EA	EACH
EDF	ELECTRIC DRINKING FOUNTAIN
EF	EXHAUST FAN
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM
EJ	EXPANSION JOINT
ELEC	ELECTRIC(AL)
ELEV	ELEVATION
EPC	ELECTROSTATIC POWDER COATING
EPS	ELECTROSTATIC PAINTING SYSTEM
EQ	EQUAL
EQUIP	EQUIPMENT
ES	ELASTOMERIC SEALANT
EX/EXIST	EXISTING
EXH	EXHAUST
EXT	EXTERIOR
EW	EACH WAY
F, (F)	FUTURE
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDN	FOUNDATION
FEX	FIRE EXTINGUISHER
FG	FINISH GRADE
FIN	FINSH(ED)
FLR	FLOOR(ING)
FLOUR	FLOURESCENT
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FOIC	FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR
FRS	FIRE RETARDANT SEALANT
FS	FIXED SHELF
FTG	FOOTING
FURR	FURRED (ING)
FV	FIELD VERIFY
GA	GAGE, GAUGE
GI	GALVINIZED IRON
GL	GLASS, GLAZING
GS	GLAZING SIDE
GWT	GLAZED WALL TILE
GYP	GYPSUM
HB	HOSE BIBB
HC	HOLLOW CORE
HD	HEAVY DUTY
HDR	HEADER
HDBD	HARDBOARD
HDWD	HARDWOOD
HDWR	HARDWARE
HFEX	HALON FIRE EXTINGUISHER
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HT	HEIGHT
HVAC	HEATING/VENTILATING/ AIR CONDITIONING
ID	INSIDE DIAMETER
INFO	INFORMATION
INSUL	INSULATE (D), (ION)
INT	INTERIOR
JST	JOIST
JT	JOINT
K	KICKER
KS	KNEE SPACE
LAV	LAVATORY
LL	LIVE LOAD
LT	LIGHT
MAX	MAXIMUM
MB	MACHINE BOLT
MBL	MINI BLIND
MC	MEDICINE CABINET
MDO	MEDIUM DENSITY OVERLAY
MECH	MECHANIC(AL)
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MET	METAL
MFR	MANUFACTURE(R)
MIN	MINUMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MRT	MOLDED RUBBER FLOOR TILE
MT	METAL THRESHOLD
MTD	MOUNTED
MTL	MATERIAL
NAT	NATURAL
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OBS	OBSCURE
OC	ON CENTER(S)
OD	OUTSIDE DIAMETER
OFRD	OVERFLOW ROOF DRAIN
OH	OVERHEAD
OPNG	OPENING
PA	PLANTING AREA
PFR	POLYURETHANE FOAM ROOFING
PJ	POUR JOINT
PL	PROPERTY LINE
PLAM	PLASTIC LAMINATE
PLAS LAM	PLASTIC LAMINATE
PLAS	PLASTER
PLBG	PLUMBING
PRC	POLYURETHANE ROOF COATING
P.O.T.	PATH OF TRAVEL
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PVMT	PAVEMENT
PWD	PLYWOOD
RA	RETURN AIR, RUBBER ACCESSORY
RASF	RUBBERIZED ASPHALT SHEET FLASHING
RASWD	RUBBER ASPHALT SHEET WATER PROOFING
RAD	RADIUS
RD	ROOF DRAIN
REF	REFRIGERATOR
REFL	REFLECTED
REG	REGISTER
REQ(S)	REQUIREMENT(S)
REQ'D	REQUIRED
REV	REVISION(S), REVISED
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RR	ROOF RAFTER
RS	REDUCER STRIP
RSTA	RUBBER STAIR TREAD ACCESSORY
RWB	RUBBER WALL BASE
SC	SOLID CORE
SCHED	SCHEDULE
SD	STORM DRAIN
SF	SQUARE FOOT
SFRM	SPRAYED FIRE-RESISTIVE MATERIAL
SG	SAFETY GLAZING (FULLY TEMPERED)
SHTG	SHEATHING
SHT(S)	SHEET(S)
SIM	SIMILAR
SJ	SEALED JOINT
SJF	SAWN JOINT FILLED
SP	SOLID POLYMER
SPEC(S)	SPECIFICATION(S)
SQ	SQUARE
SS	STAINLESS STEEL
STD(S)	STANDARD(S)
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL
T	TEMPERED
T/M/B	TOP/MIDDLE/BOTTOM
TC	TOP OF CONCRETE
TER	TERRAZZO
TH	THICK(NESS)
TOC	TOP OF CONCRETE
TOS	TOP OF SEAT
TOW	TOP OF WALL
TP	TOP OF PAVING
TV	TELEVISION
TW	TOP OF WALK
TWP	TRANSLUCENT WALL PANEL
TYP	TYPICAL
UCMT	UNGLAZED CERAMIC WALL TILE
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
URI	URINAL
VCT	VINYL COMPOSITION FLOOR TILE
VCTB	VINYL COVERED TACKBOARD
VERT	VERTICAL
VTS	VINYL TACK SURFACE
VWC	VINYL WALL COVERING
W.	WEST
W/	WITH
WC	WATER CLOSET
WD	WOOD
WH/	WHERE
WI	WROUGHT IRON
W/O	WITHOUT
WP	WATERPROOFING
WT	WEIGHT
WWF	WELDED WIRE FABRIC
XFMR	TRANSFORMER

17-01-11

SYMBOLS (PARTIAL LIST)

- COORDINATE LINE
- BUILDING SECTION NUMBER / SHEET NUMBER
- DETAIL NUMBER / SHEET NUMBER
- ELEVATION, X REFERENCE OR DATUM
- DOOR NUMBER
- WINDOW LETTER(S)
- REVISION NUMBER WITH CLOUD
- ACCESSORY NUMBER, REFER TO ACCESSORY SCHEDULE
- COLUMNS – SIZE AS NOTED ON STRUCTURAL SHEETS
- FLUSH SURFACES THAT MEET
- NIC — NOT IN CONTRACT BY OTHERS (N.I.C. HAS TO BE WRITTEN WITH DASHED LINES)
- KEYNOTE
- WALL TYPE W/ LOCATION OF MULTIPLE LAYERS WH/ NOTED
- RA# — REDUCER STRIP/FLOOR ASSEMBLY– SEE SCHEDULE
- ES# — SEALANT DESIGNATION– SEE SCHEDULE
- FRS# — FIRE RETARDANT SEALANT– SEE SCHEDULE
- 100 ROOM NAME — ROOM REFERENCE
- EARTH MATERIAL
- GRANULAR FILL
- METAL FRAMING
- INSULATION – BATT
- STEEL
- PLASTIC, AS NOTED
- SAND
- INSULATION – RIGID FOAM, FIBERGLASS
- ASPHALTIC CONCRETE INSULATION – RIGID PERLITE
- CONCRETE
- WOOD FINISH
- WOOD CONTINUOUS
- WOOD BLOCKING
- PLYWOOD
- GYP BD

DSA

1. ALL WORK SHALL CONFORM TO TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).
2. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY REVISIONS, ADDENDA OR CONSTRUCTION CHANGE DOCUMENTS (CCD) APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
3. A 'DSA CERTIFIED' PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR.
4. A 'DSA CERTIFIED' INSPECTOR WITH CLASS 1 CERTIFICATION IS REQUIRED FOR THIS PROJECT.
5. A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE SCHOOL BOARD SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.
6. GRADING PLANS, DRAINAGE IMPROVEMENTS, ROAD AND ACCESS REQUIREMENTS AND ENVIRONMENTAL HEALTH CONSIDERATIONS SHALL COMPLY WITH ALL LOCAL ORDINANCES.
7. FOOD HANDLING FACILITIES SHALL COMPLY WITH ALL LOCAL HEALTH DEPARTMENT REQUIREMENTS AND CALIFORNIA UNIFORM RETAIL FOOD FACILITY LAW.
8. REFER TO PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS OF DSA AND OTHER APPROVING/PERMITING AUTHORITIES IN THE EVENT OF ANY DISCREPANCIES, CONFLICTS OR DUAL REQUIREMENTS THE MORE RESTRICTIVE REQUIREMENTS SHALL PREVAIL.

17-01-24M

SCOPE OF WORK

NEW CONSTRUCTION OF A STUDENT CENTER BUILDING AND ASSOCIATED SITE WORK AND DEMOLITION OF EXISTING DORM BUILDINGS AND RELATED SITE WORK.

17-01-20

APPROVALS

RECOMMEND FOR APPROVAL

DR DENA MALONEY — DATE
PRESIDENT/SUPERINTENDENT TAFT COLLEGE

BROCK MCMURRAY — DATE
EXECUTIVE VICE PRESIDENT TAFT COLLEGE

DIRECTORY

Owner
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WEST KERN COMMUNITY COLLEGE DISTRICT
29 COUGAR COURT
TAFT, CA 93268

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FAX: (661) 322-4128
ATTN: DAN BOYANCE

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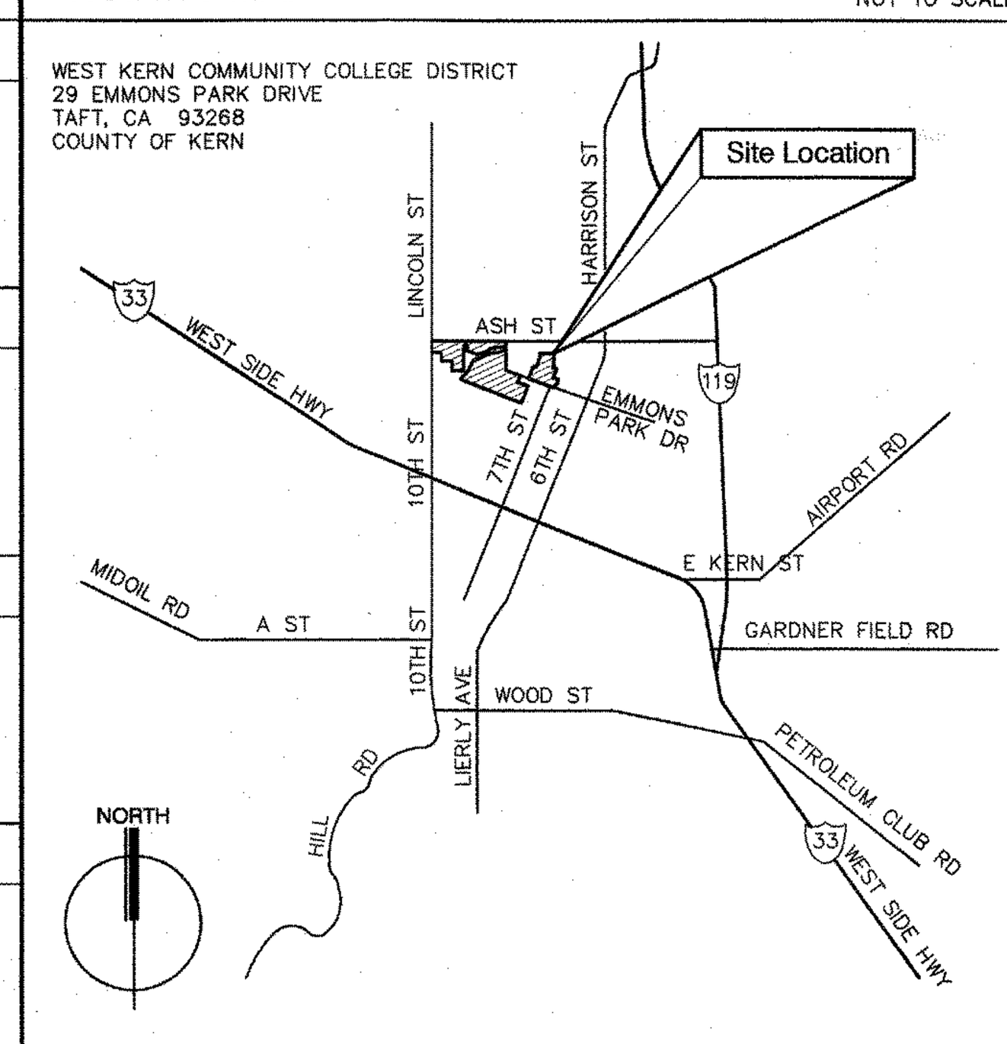
DONALD MOSER
4122 VENTURA CANYON AVENUE
SHERMAN OAKS, CA 91423
PHONE: (818) 789-1260
OFFICE: (818) 981-9173

17-01-15M

VICINITY MAP

NOT TO SCALE

WEST KERN COMMUNITY COLLEGE DISTRICT
29 EMMONS PARK DRIVE
TAFT, CA 93268
COUNTY OF KERN



17-01-10

DEFERRED APPROVALS

1. CURTAIN WALL SYSTEM (> 10 FT SPAN).
2. OPEN WEB STEEL JOISTS. REFER TO IR 22-3.10 FOR SUBMITTAL APPROVAL.

Project design professional prepares construction documents (plans and specifications) for the project. In addition to the requirements in CBC Section 2206A.2, the portion of the construction documents pertaining to OWSJ shall also include the following:

- Structural framing plan including layout of OWSJ and all supporting elements
- Loading diagrams for all OWSJ in accordance with CBC Section 2206A.2 (2206.2*), Item 1 and any deflection requirement.
- Specify the SJI joist designation for each joist. The designation shall comply with CBC Section 2206A.2 (2206.2*).
- Project specifications shall require that OWSJ manufacturer(s) comply with Section 1 of this IR. The project design professional should closely coordinate OWSJ design (including all connections, non-standard products, and details) with a qualified OWSJ manufacturer prior to the submittal of contract documents for DSA review.
- Project specifications and Statement of Special Inspections (CBC Sections 1704A.1.1 and 1705A) shall include testing and inspection requirements for OWSJ per Section 7 of this IR.
- The following note shall be shown on the plans:

"Mechanical, electrical, and plumbing units and elements shall be coordinated with manufacturer's joist document prior to field installation. Field modification of OWSJ is prohibited without the prior approval of DSA."

- As an option, joist documents as described in Section 4 below may be included with the construction documents. Otherwise, they are submitted as deferred approval per Section 4 below and Title 24, Part 1, Section 4-317(g).

Project design professional submits application and construction documents to DSA for review.

After the DSA plan review process is completed, the approved construction documents will bear the DSA identification stamp with the initials of the plan reviewer.

I find that: ☐ All drawings or sheets listed on the cover or index sheet
☒ This drawing or page FP1.0

☒ is/are in general conformance with the project design, and ☒ has/have been coordinated with the project plans and specifications.	☒ is/are in general conformance with the project design intent, and ☒ has/have been coordinated with the project plans and specifications.
Signature: [signature] Date: 9/15/15	Signature: [signature] Date: 9/15/15
Architect or Engineer designated to be in general responsible charge	**Architect or Engineer delegated responsibility for this portion of the work**
Print Name: KEVIN COBB	Print Name: JEFFREY E. HAIGHT
License Number: C-26729 Expiration Date: 10/31/15	License Number: S4313 Expiration Date: 9/30/16

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West Kern Community College District

DSA SET

ARCHITECT

LICENSED ARCHITECT — KEVIN COBB — C-26729 — REN 10-31-15 — STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

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DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
AC N.N. FLS — SS [initials]
DATE SEP 16 2015

PROJECT INFO

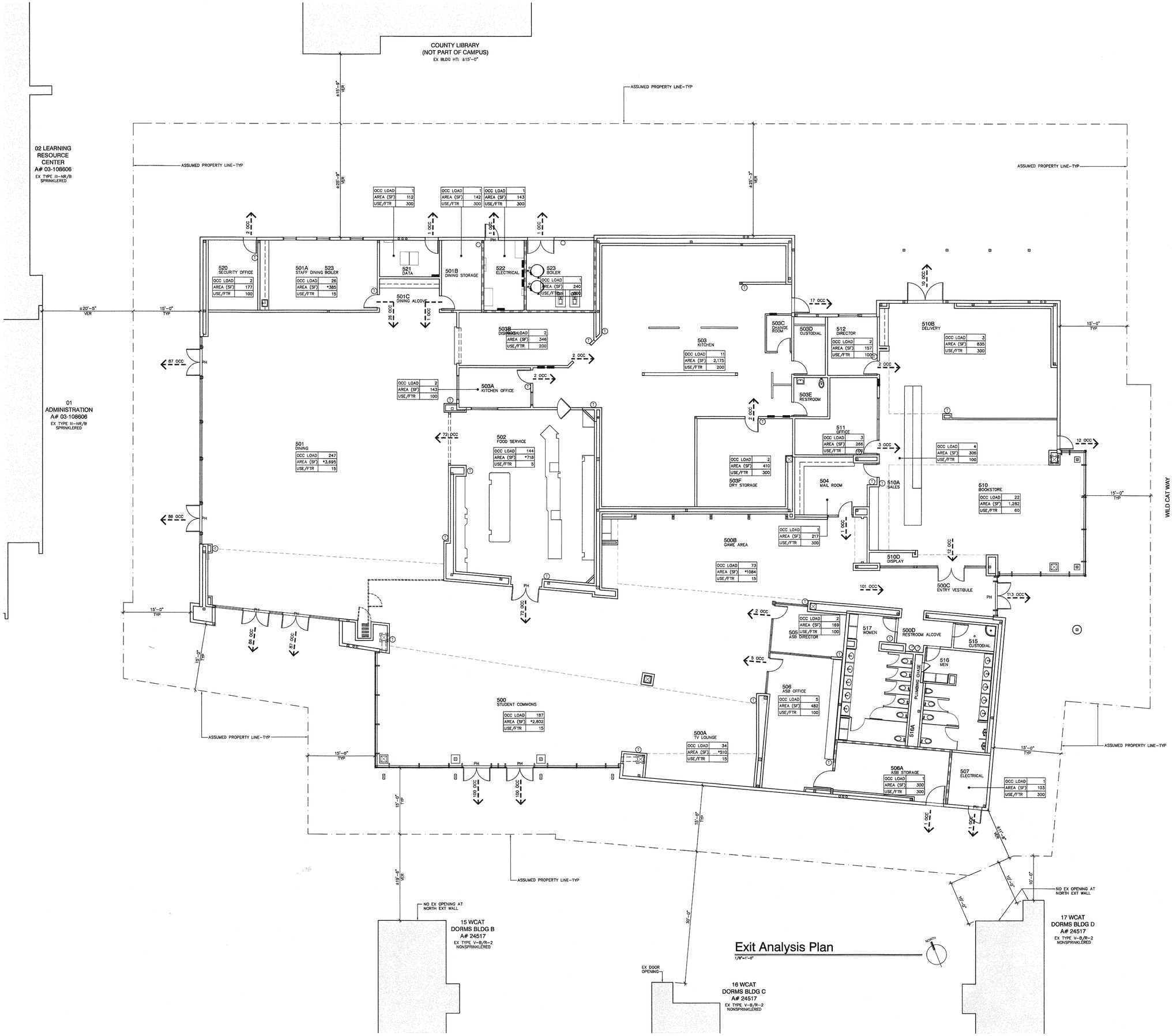
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
*	00.00.00	DESCRIPTION

TITLE SHEET

A0.00



Exit Analysis Plan

1/8"=1'-0"

BUILDING ANALYSIS

TYPE OF CONSTRUCTION:	TYPE II-B
OCCUPANCY CLASSIFICATION:	A-2/F-1/M (NONSEPARATED OCC)
OCCUPANT LOAD:	SEE OCCUPANT LOAD ANALYSIS
BUILDING HEIGHT:	+35'-0" < ALLOWABLE HEIGHT
NUMBER OF STORIES:	ONE
BUILDING FLOOR AREA:	21,100 SF < ALLOWABLE AREA
AUTOMATIC SPRINKLERS:	YES
STAND PIPE:	NOT REQUIRED
FIRE ALARM:	YES
SEISMIC DESIGN CATEGORY:	D
WIND LOAD ANALYSIS:	85 MPH - EXPOSURE C

ALLOWABLE AREA ANALYSIS

BASIC ALLOWABLE (TABLE 503):
A-2 (MOST RESTRICTIVE)/TYPE II-B 9,500 SF

ALLOWABLE AREA CALCULATIONS (SECTION 506)
1. AUTOMATIC SPRINKLER INCREASE: 9,500x3=28,500 SF
2. FRONTAGE INCREASE: NOT USED

TOTAL ALLOWABLE AREA: 38,000 SF

OCCUPANT LOAD ANALYSIS

ROOM #	NAME	AREA	FACTOR	OCC
500	STUDENT COMMONS	*2,802	15	187
500A	TV LOUNGE	*510	15	34
500B	GAME AREA	*1,084	15	73
500C	ENTRY VESTIBULE	330	0	0
500D	RESTROOM ALCOVE	84	0	0
501	DINING	*3,695	15	247
501A	STAFF DINING	*385	15	26
501B	DINING STORAGE	142	300	1
502	FOOD SERVICE	*718	5	144
503	KITCHEN	2,175	200	11
503A	KITCHEN OFFICE	143	100	2
503B	DISHWASH	346	200	2
503C	CHANGE ROOM	46	0	0
503D	CUSTODIAL	94	0	0
503E	RESTROOM	63	0	0
503F	DRY STORAGE	410	300	2
504	MAIL ROOM	217	300	1
505	ASB DIRECTOR	169	100	2
506	ASB OFFICE	482	100	5
506A	ASB STORAGE	300	300	1
507	ELECTRICAL	103	300	1
510	BOOKSTORE	1,282	60	22
510A	SALES	306	100	4
510B	DELIVERY	835	300	3
511	OFFICE	286	100	3
512	DIRECTOR	157	100	2
515	CUSTODIAL	60	0	0
516	MEN	333	0	0
517	WOMEN	388	0	0
520	SECURITY OFFICE	177	100	2
521	DATA	112	300	1
522	ELEC	143	300	1
523	BOILER	240	300	1
	TOTAL			778

* INDICATES NET SQUARE FOOTAGE

FIRE RESISTIVE REQUIREMENTS

MINIMUM REQUIREMENTS BASED ON TYPE II-B

ELEMENT	RATING	REMARKS
PRIMARY STRUCTURAL FRAME	0 HR	TABLE 601
BEARING WALLS - EXTERIOR	0 HR	TABLE 601
BEARING WALLS - INTERIOR	0 HR	TABLE 601
NONBEARING WALLS AND PARTITIONS - EXTERIOR (10' TO LESS THAN 30')	0 HR	TABLE 602
NONBEARING WALLS AND PARTITIONS - INTERIOR	0 HR	TABLE 601
SHAFT ENCLOSURES	NA	SECTION 708
FLOORS CONSTRUCTION AND SECONDARY MEMBERS	0 HR	TABLE 601
ROOFS CONSTRUCTION (INCL. STRUCTURAL FRAME)	0 HR	TABLE 601
EXT WALL OPENING-UP'S (15' TO LESS THAN 20')	75% MAX	TABLE 705.8
MINIMUM ROOF CLASSIFICATION	C	TABLE 1501.1
STAIRWAY CONSTRUCTION	NA	SECTION 1022

ANALYSIS PLAN WALL TYPE LEGEND

RATED WALL, SEE A2.20 FOR MORE INFORMATION

NON-RATED WALL, SEE A2.20 FOR MORE INFORMATION

APPLICABLE CODES

TITLE 24, CCR

PART 1 2010 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE

PART 2 2010 CALIFORNIA BUILDING CODE VOLUME 1 AND 2 (2009 IBC AND CALIFORNIA AMENDMENTS)

PART 3 2010 CALIFORNIA ELECTRICAL CODE (2008 NATIONAL ELECTRICAL CODE AND CALIFORNIA AMENDMENTS)

PART 4 2010 CALIFORNIA MECHANICAL CODE (2009 UNIFORM MECHANICAL CODE AND CALIFORNIA AMENDMENTS)

PART 5 2010 CALIFORNIA PLUMBING CODE (2009 UNIFORM PLUMBING CODE AND CALIFORNIA AMENDMENTS)

PART 6 2010 CALIFORNIA ENERGY CODE

PART 9 2010 CALIFORNIA FIRE CODE (2009 INTERNATIONAL FIRE CODE AND CALIFORNIA AMENDMENTS)

PART 12 2010 CALIFORNIA REFERENCED STANDARDS

TITLE 19, CCR

PUBLIC SAFETY, SFM REGULATIONS

FEDERAL CODES AND STANDARDS

ADA 2010, TITLE II

TITLE II UNIFORM FEDERAL ACCESSIBILITY STANDARS (UFAS) OR ADA STANDARDS FOR ACCESSIBLE DESIGN (APPENDIX A OF 28 CFR PART 36)

REFERENCED STANDARDS

NFPA 13 2010 EDITION, THE INSTALLATION OF AUTOMATIC SPRINKLER SYSTEMS, AS AMENDED

NFPA 14 2007 EDITION, INSTALLATION OF STANDPIPE, PRIVATE HYDRANT AND HOSE SYSTEMS

NFPA 17 2002 EDITION, DRY CHEMICAL EXTINGUISHING SYSTEMS

NFPA 17A 2002 EDITION, WET CHEMICAL EXTINGUISHING SYSTEMS

NFPA 20 2007 EDITION, STATIONARY PUMPS FOR FIRE PROTECTION

NFPA 22 2003 EDITION, WATER TANKS FOR PRIVATE FIRE PROTECTION

NFPA 24 2010 EDITION, INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES

NFPA 25 2008 EDITION, INSPECTION, TESTING, MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS (CA AMENDED)

NFPA 72 2010 EDITION, NATIONAL FIRE ALARM CODE (CA AMENDED)

NFPA 80 2007 EDITION, FIRE DOOR AND OPENING PROTECTIVES

REFERENCE CODE SECTION FOR NFPA STANDARDS-CBC (SFM) CHAPTER 35

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BLDG ANALYSIS
EXIT ANALYSIS PLAN

A0.10

DSA-810 – LOCAL FIRE AUTHORITY REVIEW FORM
For instructions, see CFA-2019-N-1 (and DSA Policy 09-01)

DSA-810 LOCAL FIRE AUTHORITY REVIEW DSA Application #: 03-[ ]

School District: Wes: Kern Community College District

Project address: 29 Emmons Park Drive, Taft, CA 93268

Local Fire Authority is to complete Sections 1-7 as applicable to this project and sign below. (Check sections 1-7 per key.)

KEY: "YES" = Complies with LFA Requirements "N/A" = Not applicable to this project
"N/R" = LFA elects not to review No Check mark = Reviewed but not approved. Complete Section 7.

YES	N/A	N/R		
1. ☐	☒	☐	**Elevators**	Where an elevator does not meet modified emergency service per 2010 California Building Code, the Local Fire Authority approves the use of stairways for emergency rescue and patient transport.
2. ☒	☐	☐	**Access Roads**	Access Roads, Fire Lane Markings, pavers and Gate Entries are in accordance with Title 19, Div. 1, Code of Regulations & 2010 California Fire Code, Chapter 5.
3. ☒	☐	☐	**Fire Flow**	Fire Hydrant location and distribution complies with ☐2013 CFC ☐NFPA 1142 (Alternate Means) When "N/R" is checked, DSA can only review on-site water storage as an alternate means. Signature of the School District Official is required to acknowledge use of NFPA 1142 as LFA alternate means.
				SIGNATURE of SCHOOL DISTRICT OFFICIAL (Sign and print name and title) (Date)
4. ☐	☐	☒	**Automatic Fire Sprinkler Systems**	The location(s) of the proposed Post Indicator Valve & Fire Department Connection meet the requirements of this jurisdiction.
5. ☐	☐	☒		The location(s) of the Detector Check Valve Assembly meet the requirements of this jurisdiction.
6. Is project located in a Hazard Severity Zone Area? (2010 CBC, Chapter 7A, Section 701A.3.1)				Yes ☐ No ☒ If YES, Type (check one): Moderate ☐ High ☐ Very High ☐ WUIA ☐ (If one of these boxes is checked plans will have to meet requirements of Chapter 7A)

7. COMMENTS: Note Deficiencies: _____

8. **LOCAL FIRE AUTHORITY INFORMATION:**

AGENCY NAME (Print): Kern County Fire Department
ADDRESS (Print): 5642 Victor Street
CITY/STATE/ZIP (Print): Bakersfield, CA 93308
PHONE NUMBER (Print): (661) 391-7080 e-mail: mnicho@fire.kern.ca.us

Completion of 1 to 7 (including school district representative signature on line 7 if alternate means required) and 8 signature below signifies that the Local Fire Authority has reviewed the listed items for this project. Items not checked or marked n/a will be reviewed by the DSA.

Note: Only sign the DSA-810 when imaged onto the site plan, loose form not acceptable to DSA.

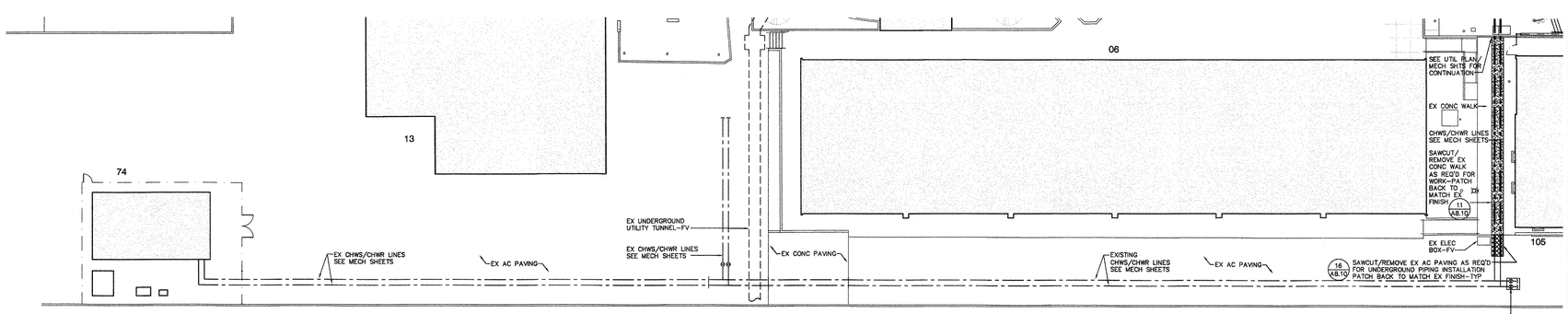
REVIEWED BY: Michael Nicholas (Print name) (Signature) 9/14/15 (Date)
RANK/TITLE (Print): Engineer

DSA-810 Local Fire Authority Review (rev.04-29-13) DGS CAPITAL OUTLAY BUREAU Page 1 of 1

A. Partial Site Plan

1"=20'-0"

CONTRACTOR TO VERIFY FINAL CONDITION OF LINE CONNECTIONS WITH ALLEY PROJECT



ACCESSIBLE PATH OF TRAVEL

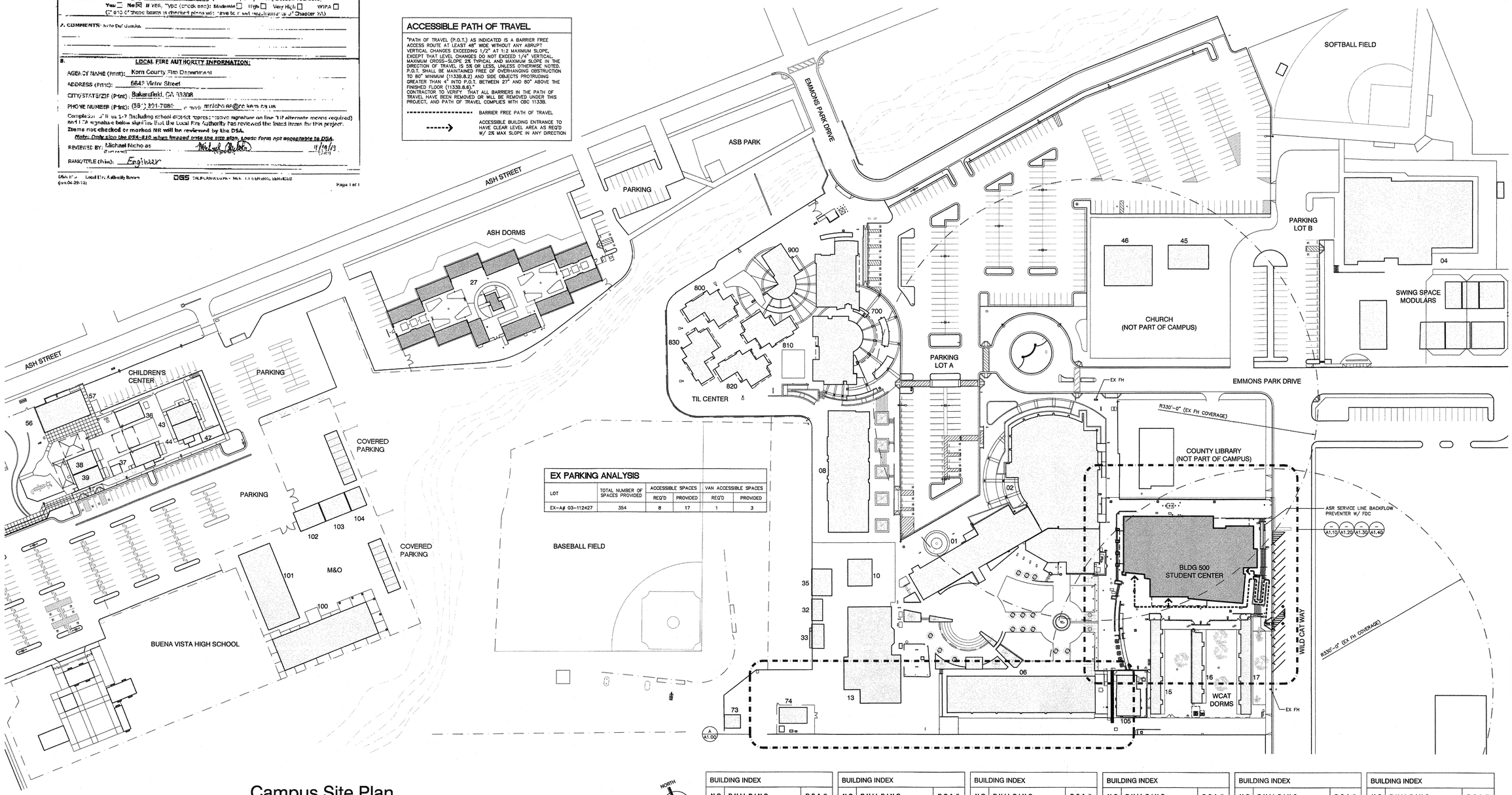
"PATH OF TRAVEL (P.O.T.) AS INDICATED IS A BARRIER FREE ACCESS ROUTE AT LEAST 48" WIDE WITHOUT ANY ABRUPT VERTICAL CHANGES EXCEEDING 1/2" AT 1:2 MAXIMUM SLOPE, EXCEPT THAT LEVEL CHANGES DO NOT EXCEED 1/4" VERTICAL. MAXIMUM CROSS-SLOPE 2% TYPICAL AND MAXIMUM SLOPE IN THE DIRECTION OF TRAVEL IS 5% OR LESS, UNLESS OTHERWISE NOTED. P.O.T. SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTION TO 80" MINIMUM (11338.8.2) AND SIDE OBJECTS PROTRUDING GREATER THAN 4" INTO P.O.T. BETWEEN 27" AND 80" ABOVE THE FINISHED FLOOR (11338.8.6). CONTRACTOR TO VERIFY THAT ALL BARRIERS IN THE PATH OF TRAVEL HAVE BEEN REMOVED OR WILL BE REMOVED UNDER THIS PROJECT, AND PATH OF TRAVEL COMPLIES WITH CBC 11338.

BARRIER FREE PATH OF TRAVEL

ACCESSIBLE BUILDING ENTRANCE TO HAVE CLEAR LEVEL AREA AS REQ'D W/ 2% MAX SLOPE IN ANY DIRECTION

EX PARKING ANALYSIS

LOT	TOTAL NUMBER OF SPACES PROVIDED	ACCESSIBLE SPACES		VAN ACCESSIBLE SPACES	
		REQ'D	PROVIDED	REQ'D	PROVIDED
EX-A# 03-112427	354	8	17	1	3



Campus Site Plan

1"=60'-0"

BUILDING INDEX		
NO	BUILDING	DSA#
01	ADMINISTRATION	108606
02	LEARNING RESOURCE CENTER	108606
04	COUGAR SPORTS CENTER	–
06	SCIENCE	110101
07	STAFF HOUSE	REMOVED*
08	TECHNICAL ARTS	111182
10	IT OFFICE	–
13	STUDENT CENTER	–
14	WCAT DORMS - BLDG A	REMOVED*

BUILDING INDEX		
NO	BUILDING	DSA#
15	WCAT DORMS – BLDG B	24517
16	WCAT DORMS – BLDG C	24517
17	WCAT DORMS – BLDG D	24517
18	WCAT DORMS - BLDG E	REMOVED*
19	T-DORMS	REMOVED*
20	RESIDENCE LOUNGE	REMOVED*
27	ASH DORMS	–
32	FOOD/BOOK STORAGE	–
33	CLUBHOUSE	–

BUILDING INDEX		
NO	BUILDING	DSA#
35	GENERAL OFFICES	–
36	CHILDCARE 8	–
37	CHILDCARE 3	–
38	CHILDCARE 4	–
39	CHILDCARE 5	–
40	CHILD DEVELOPMENT CENTER	–
41	CHILDCARE 6	–
42	CHILDCARE 7	–
43	CHILDCARE 1	–

BUILDING INDEX		
NO	BUILDING	DSA#
44	CHILDCARE 2	–
45	DENTAL HYGIENE A	–
46	DENTAL HYGIENE B	–
47	CHILD CARE LOUNGE	–
56	CHILDCARE 10	–
57	CHILDCARE 9	–
58	STUDENT SUPPORT	REMOVED*
73	BASEBALL STORAGE	–
74	CENTRAL PLANT	–

BUILDING INDEX		
NO	BUILDING	DSA#
100	MAINTENANCE OPERATIONS	–
101	STORAGE	–
102	VEHICLE STORAGE	–
103	VEHICLE STORAGE	–
104	STORAGE	–
105	S.T.E.M.	113084
500	STUDENT CENTER	PROPOSED
700	TIL CENTER MAIN BLDG	112427
800	TIL CENTER DORMS	112427

BUILDING INDEX		
NO	BUILDING	DSA#
810	TIL CENTER DORMS	112427
820	TIL CENTER DORMS	112427
830	TIL CENTER DORMS	112427
900	TIL CENTER STUDENT LOUNGE	112427

*EX BLDGS TO BE REMOVED IN THIS PROJECT SEE SITE DEMOLITION PLAN SHEET A1.10 FOR REMOVED BLDG LOCATIONS

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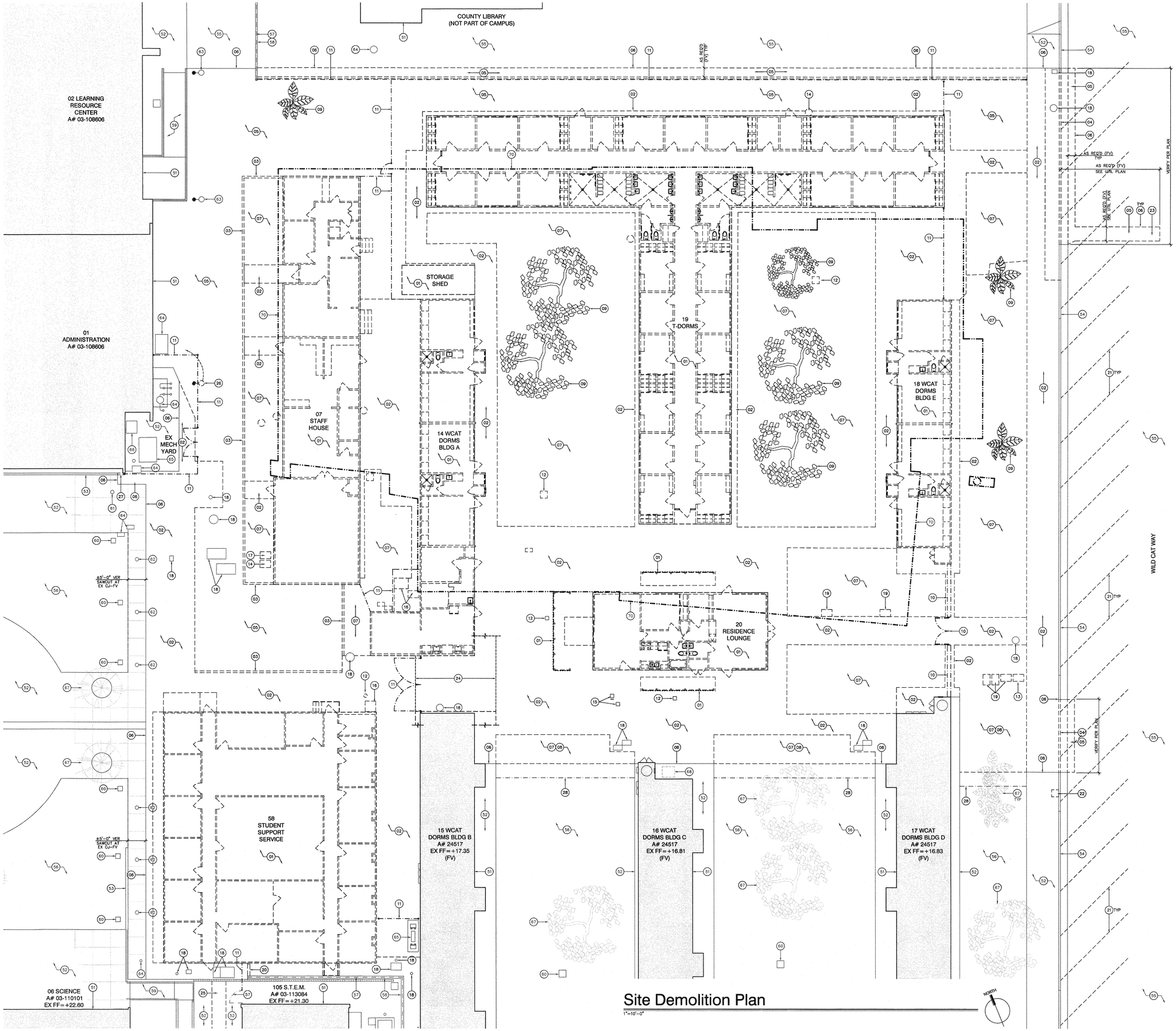
CAMPUS SITE PLAN/
A. PARTIAL SITE PLAN

A1.00



Site Demolition Plan

1"=10'-0"

GENERAL SITE/UTILITY PLAN NOTES

1. ALL EXISTING LOCATIONS AND SIZES ARE INDICATED AS ADVISORY. FIELD VERIFY ACTUAL DIMENSIONS, LOCATIONS AND CONDITIONS AS REQUIRED FOR INTENDED WORK AND MAKE ADJUSTMENTS ACCORDINGLY.
2. SEE ELEC, MECH, PLBG AND LANDSCAPE/IRRIGATION SHEETS FOR ADDITIONAL CUT/PATCH AT EX SURFACES AS REQ'D FOR WORK-FINISH SURFACES TO MATCH ADJACENT SURFACES.
3. SEE GEOTECHNICAL ENGINEERING AND GEOLOGIC/SEISMIC HAZARD INVESTIGATION REPORT FOR OVER-EXCAVATION/SITE PREPARATION AND OTHER INFO AND REQUIREMENTS.
4. FIELD VERIFY AND REMOVE ABANDONED/UNUSED UTILITY LINES AND RELATED ITEMS WITHIN PROJECT SITE--CAP/TERMINATE AT UNDERGROUND POC AS REQ'D--CUT/PATCH EX SURFACES TO REMAIN AS REQ'D FOR WORK.
5. FIELD VERIFY EX UTILITY BOXES/COVERS TO REMAIN AT NEW FINISH AREA--ADJUST TOP TO MATCH NEW FINISH.
6. FIELD VERIFY AND TAKE NECESSARY CARE TO PROTECT EX UNDERGROUND UTILITIES DURING CONSTRUCTION.
7. SEE PROJECT MANUAL FOR ADDITIONAL UNDERGROUND PIPING INFO AND REQS.

ABATEMENT NOTES

1. SEE PROJECT MANUAL FOR ASBESTOS/LEAD REPORT AND ABATEMENT SCOPE OF WORK/SPECIFICATIONS.

SITE DEMOLITION KEYNOTES

01. REMOVE EX BLDG, FOUNDATION, FOOTING, UTILITIES AND OTHER RELATED ITEMS--SEE ABATEMENT NOTES ABOVE SEE PROJECT MANUAL FOR ADDITIONAL INFO AND REQS
02. REMOVE EX CONC WALK/PAVING/MOW STRIP
03. REMOVE EX CONC CURB
04. REMOVE EX CURB/GUTTER--SAWCUT/REMOVE/PATCH EX AC PAVING AS REQ'D FOR WORK--VERIFY LOCATION PER PLAN
05. REMOVE EX AC PAVING
06. CLEAN/STRAIGHT SAWCUT AS REQ'D--FV
07. REMOVE EX GRASS/IRRIGATION SYSTEM
08. FV/RELOCATE/REINSTALL EX IRRIGATION AS REQ'D
09. REMOVE EX TREE
10. REMOVE EX TS GATES/WALL/FTG--PATCH AT EX BLDG TO REMAIN
11. REMOVE EX CL FENCE/GATES
12. REMOVE EX STORM DRAIN/CATCH BASIN/SEWER/CO
13. RELOCATE EX WATER METER (FV)--SEE SITE/UTILITY PLANS
14. REMOVE EX GAS--SEE SITE/UTILITY PLANS
15. REMOVE EX WATER--SEE SITE/UTILITY PLANS
16. REMOVE EX TRANSFORMER--SEE ELEC SHEETS
17. REMOVE EX CABLE BOX--SEE ELEC SHEETS
18. EX UTILITY TO REMAIN--ADJUST TOP TO MATCH NEW FINISH--SEE SITE/GRADING PLANS
19. FV/REMOVE ABANDONED UTILITY LINES AND BOXES
20. SAWCUT/REMOVE PORTION OF RETAINING WALL
21. GRIND/REMOVE EX PARKING STRIPING
22. CLEAN CUTOUT AT EX CONC PAVING FOR NEW SIGN POST
23. SAWCUT/REMOVE EX AC PAVING FOR CITY WATER MAIN CONNECTION--FV LOCATION/AREA AS REQ'D
24. SAWCUT/REMOVE EX ROOF BETWEEN TWO BLDGS OVER WALK WAY--SEE PARTIAL SITE PLAN H/A1.21
25. SAWCUT/REMOVE EX CONC AND AC PAVING AS REQ'D FOR NEW CHILLED WATER LINES--FV LOCATION/AREA PER PLANS SEE PARTIAL SITE PLAN A/A1.00 FOR CONTINUATION
26. REMOVE/RELOCATE EX LIGHT STD--SEE SITE PLAN/ELEC SHTS
27. SAWCUT/REMOVE EX CONC CURB AS REQ'D FOR WORK AT NEW MECH YARD WALL
28. ALLOW FOR TRANSITION GRADING AS REQ'D FOR WORK--FV REMOVE/PATCH BACK EX GRASS TO MATCH EX
29. --
30. --
31. --
32. --
33. --
34. --
35. --
36. --
37. --
38. --
39. --
40. --

SITE PLAN EXISTING KEYNOTES

51. EX BUILDING TO REMAIN
52. EX CONC PAVING
53. EX CONC CURB
54. EX CONC CURB/GUTTER
55. EX AC PAVING
56. EX GRASS AREA
57. EX CL FENCE/GATE
58. EX CMU/RETAINING WALL
59. EX ACCESSIBLE RAMP/HANDRAIL
60. EX STORM DRAIN CATCH BASIN
61. EX CODE BLUE STATION
62. EX BOLLARD LIGHT
63. EX LIGHT STANDARD
64. EX UTILITY
65. EX TRANSFORMER ON EX CONC PAD
66. EX DISTRIBUTION SWITCHBOARD
67. EX TREE
68. EX VENDING MACHINE
69. --
70. OUTLINE OF PROPOSED BLDG SHOWN FOR REFERENCE ONLY

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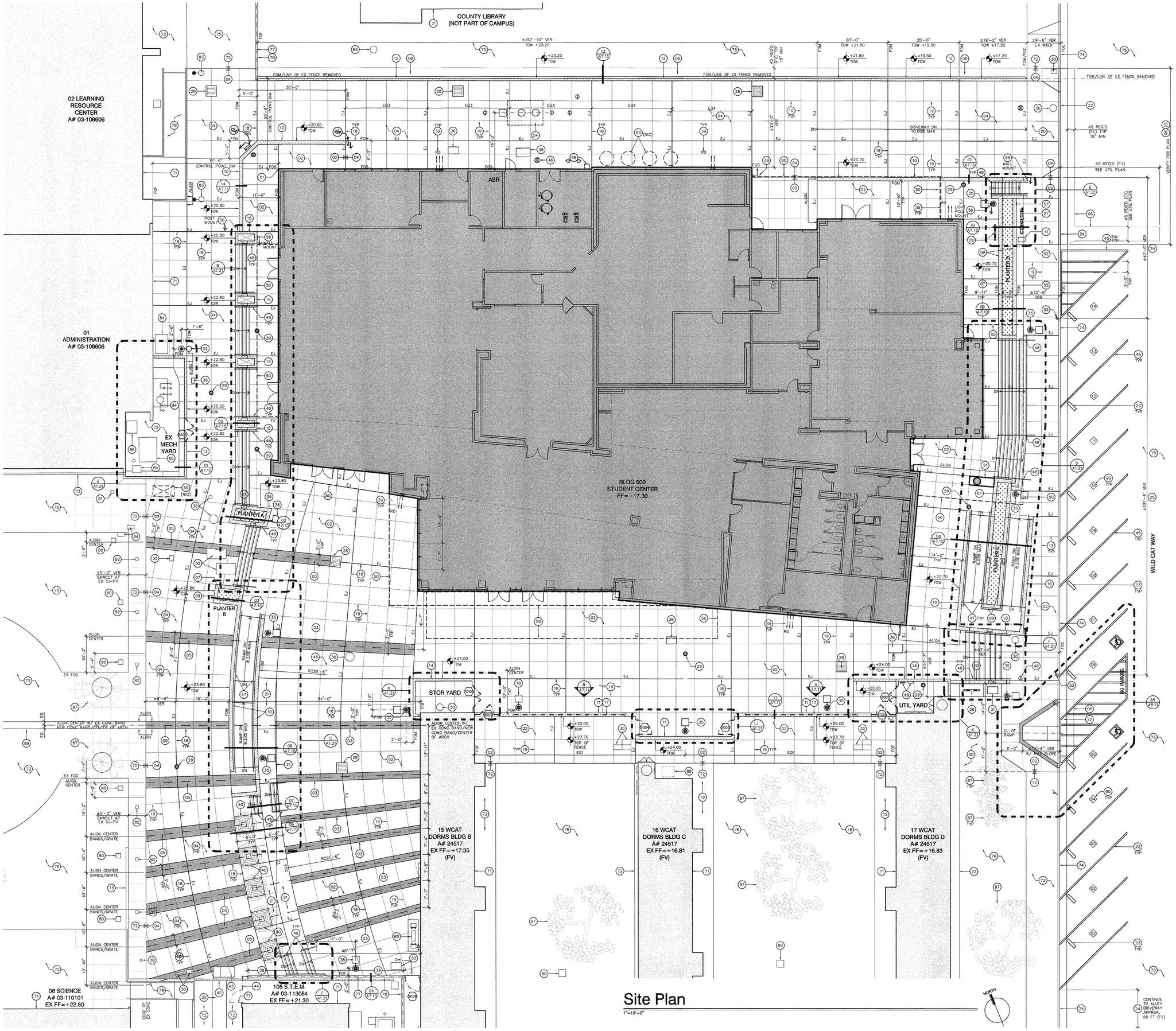
SITE DEMOLITION PLAN

A1.10



GENERAL SITE/UTILITY PLAN NOTES

1. ALL EXISTING ITEMS, LOCATIONS AND SIZES ARE INDICATED AS ADVISORY. FIELD VERIFY ACTUAL ITEMS, LOCATIONS, SIZES AND CONDITIONS AS REQUIRED FOR INTENDED WORK AND MAKE ADJUSTMENTS ACCORDINGLY.
2. SEE UTIL, ELEC, MECH, PLBG AND LANDSCAPE/IRRIGATION SHEETS FOR ADDITIONAL CUT/PATCH AT EX SURFACES AS REQ'D FOR WORK-FINISH SURFACES TO MATCH ADJACENT SURFACES.
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7. SEE PROJECT MANUAL FOR ADDITIONAL UNDERGROUND PIPING INFO AND REQS.

SITE PLAN KEYNOTES

01 LAYOUT CONTROL POINT-NORTHWEST BUILDING CORNER
02 4" CONC PAVING
03 4" EXPOSED AGGREGATE CONC PAVING W/ INTEGRAL COLOR-EJ TYP AT ALL BORDERS
04 6" CONC PAVING
05 6" EXPOSED AGGREGATE CONC PAVING W/ INTEGRAL COLOR-EJ TYP AT ALL BORDERS
06 AC PAVING PATCH-MATCH EX PAVING
07 PLANTER AREA
08 REGRADE/RELOCATE EX IRRIGATION AS REQ'D/ PATCH GRASS TO MATCH EX
09 12" CMU PLANTER WALL W/ THIN BRICK VENEER/PRECAST CONC CAP
10 12" CMU RETAINING WALL W/ THIN BRICK VENEER AND PRECAST CAP
11 12" CMU FENCE WALL W/ THIN BRICK VENEER AND PRECAST CONC CAP
12 8" CMU RETAINING WALL W/ THIN BRICK VENEER AND PRECAST CAP-CONC CURB AT LIBRARY SIDE
13 8" CMU MECH YARD WALL W/ THIN BRICK VENEER AND PRECAST CAP
14 8" CMU FENCE WALL W/ THIN BRICK VENEER AND PRECAST CONC CAP
15 8" CMU PYLON W/ THIN BRICK VENEER AND PRECAST CONC CAP AT STAIRS
16 8" CMU SCREEN WALL
17 TUBE STEEL FENCE ABOVE CMU FENCE WALL
18 CONC PAVING EXPANSION JOINT-SEE TYP PAVING AND WALL DETAILS FOR ADDITIONAL EJ LOCATIONS
19 CONC PAVING CONTROL JOINT
20 CONC DRIVEWAY APRON
21 CONC SEATING AREA
22 CONC CURB/GUTTER-MATCH EX CURB/GUTTER
23 CONC WHEEL STOP
24 PAINT EX CONC CURB RED-CLEAN/PREP EX CURB AS REQ'D
25 PAINT EX CONC CURB GREEN-CLEAN/PREP EX CURB AS REQ'D-"30 MIN BOOKSTORE PARKING ONLY" MARKING AT EACH STALL-4"H 3/4" STROKE WHITE REFLECTIVE LETTERS
26 DOMESTIC WATER BACKFLOW PREVENTER-SEE UTILITY PLAN
27 6" ASR SERVICE LINE BACKFLOW PREVENTER W/ FDC 36" MIN CLR WORKING SPACE AROUND FDC
28 CATCH BASIN-SEE UTILITY/GRADING PLANS
29 AREA DRAIN-SEE UTILITY/GRADING PLANS
30 EX UTILITY BOX/COVER TO REMAIN-ADJUST TOP TO MATCH NEW FINISH-SEE UTILITY/GRADING PLANS
31 RELOCATED EX DOMESTIC WATER METER-SEE UTILITY PLAN
32 PATCH CONC PAVING TO MATCH EX AT NEW UG CHILLED WATER LINES-FV LOCATION/AREA AS REQ'D PER PLANS SEE PARTIAL SITE PLAN A/A1.00 FOR CONTINUATION
33 TRANSFORMER/SWITCH GEAR OVER CONC PAD-SEE ELEC SHEETS
34 BOLLARD LIGHT-SEE ELEC SHEETS
35 WALK LIGHT-SEE ELEC SHEETS
36 ELEC/DATA PULL BOX-SEE ELEC SHEETS
37 WALL MOUNTED RECESSED STEP LIGHT-SEE ELEC SHEETS
38 BRICK VENEER FINISH ON EX CMU RETAINING WALL
39 CONNECT ROOF DRAIN LINES TO UNDERGROUND STORM DRAIN LINES-SEE UTILITY PLAN
40 TREE WELL W/ 5' SQUARE IRON GRATE SEE LANDSCAPE AND IRRIGATION SHEETS
41 WATER METER-SEE UTILITY PLAN
42 EX TRENCH DRAIN-REMOVE/REINSTALL PORTION OF DRAIN AS REQ'D FOR UG UTILITY WORK-SEE UTILITY PLAN
43 EX ELEC/DATA BOX-REMOVE/REINSTALL AS REQ'D FOR UG UTILITY WORK-SEE UTILITY PLAN
44 REINSTALL CL FENCE AT EX GATE
45 4" STRIPING AT 45° PARKING
46 MISC UTILITY-SEE UTILITY PLAN
47 ACCESSIBLE RAMP/HANDRAIL
48 STAIR HANDRAIL
49 STAIR HANDRAIL AT AISLE ACCESS
50 LINE OF ROOF/TRELLIS OVERHANG-SEE PLANS
51 BLDG COLUMN PEDESTAL-SEE FLOOR PLAN
52 RELOCATED EX WALK LIGHT-SEE ELEC SHEETS
53 SIGN "30 MIN BOOKSTORE PARKING ONLY" WITH DIRECTIONAL ARROW-SEE DETAIL
54 GREASE INTERCEPTOR-SEE UTILITY PLAN/PLUMBING SHEETS
55 CONC BENCH AT PLANTER 'D'
56 PATH OF TRAVEL DIRECTIONAL SIGN-MOUNTING TYPE VARIES AS NOTED-SEE DETAIL
57 ALUM FDC SIGN WALL MOUNTED "AUTOMATIC SPRINKLERS"
58 –
59 COFFEE CART (NIC)
60 TRASH BIN (NIC)

SITE PLAN EXISTING KEYNOTES

71 EX BUILDING TO REMAIN
72 EX CONC PAVING
73 EX CONC CURB
74 EX CONC CURB/GUTTER
75 EX AC PAVING
76 EX GRASS AREA
77 EX FENCE/GATE
78 EX CMU/RETAINING WALL
79 EX RAMP/HANDRAIL
80 EX CATCH BASIN
81 EX CODE BLUE STATION
82 EX BOLLARD LIGHT
83 EX LIGHT STANDARD
84 EX UTILITY
85 EX TRANSFORMER
86 EX SWITCHBOARD
87 EX TREE
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89 EX CONC ACCENT BAND
90 INDICATES NUMBER OF PARKING STALLS SHOWN FOR REF ONLY

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DSA SET

ARCHITECT

LICENSED ARCHITECT KEVIN COBB C 26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

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FILE NO. 15-C2
APP. NO. 03-115449
AC FLS SS
DATE SEP 16 2015

PROJECT INFO

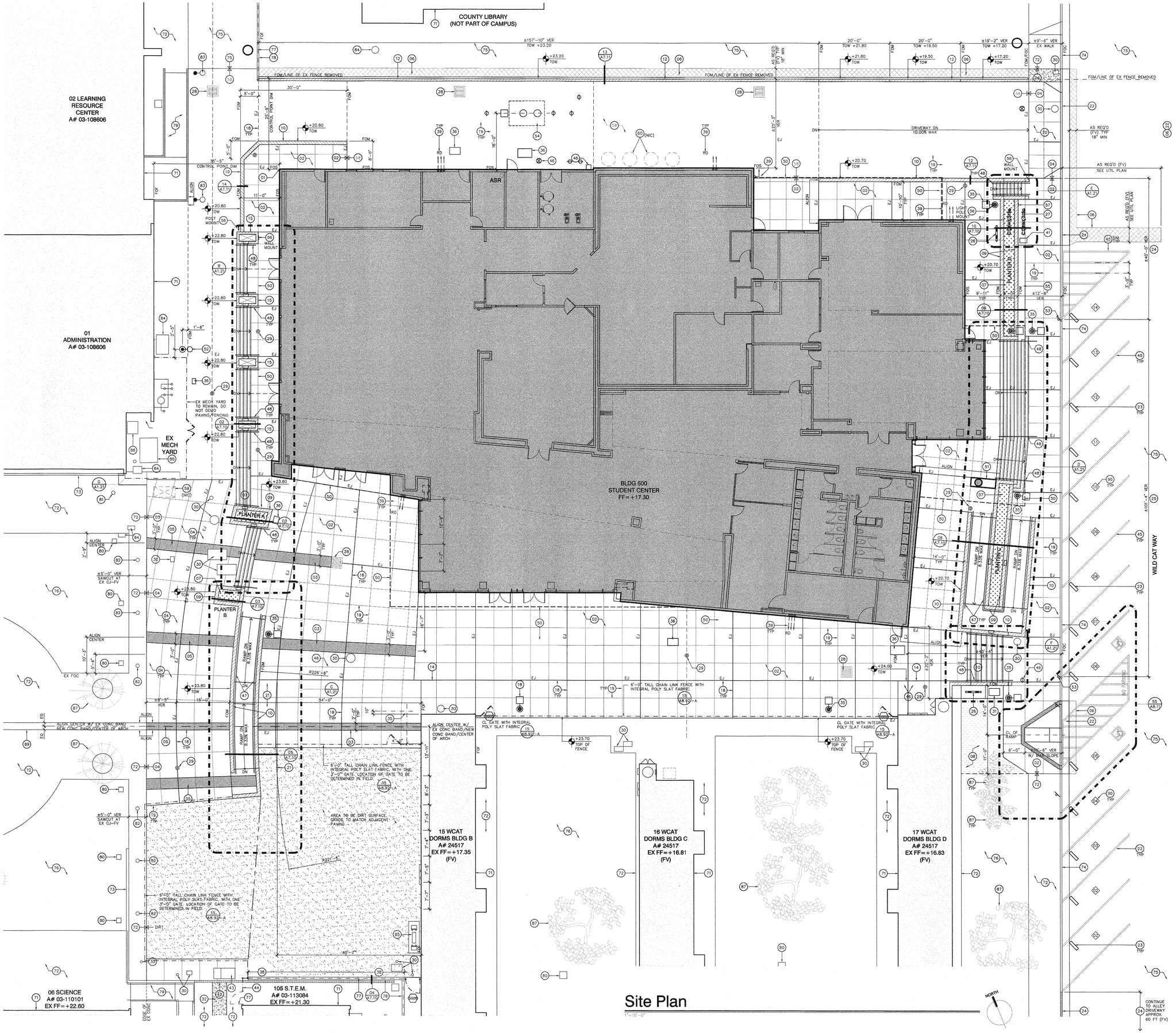
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

SITE PLAN

A1.20



Site Plan

1"=10'-0"

GENERAL SITE/UTILITY PLAN NOTES

1. ALL EXISTING ITEMS, LOCATIONS AND SIZES ARE INDICATED AS ADVISORY. FIELD VERIFY ACTUAL ITEMS, LOCATIONS, SIZES AND CONDITIONS AS REQUIRED FOR INTENDED WORK AND MAKE ADJUSTMENTS ACCORDINGLY.
2. SEE UTIL, ELEC, MECH, PLBG AND LANDSCAPE/IRRIGATION SHEETS FOR ADDITIONAL CUT/PATCH AT EX SURFACES AS REQ'D FOR WORK-FINISH SURFACES TO MATCH ADJACENT SURFACES.
3. SEE GEOTECHNICAL ENGINEERING AND GEOLOGIC/SEISMIC HAZARD INVESTIGATION REPORT FOR OVER-EXCAVATION/SITE PREPARATION AND OTHER INFO AND REQUIREMENTS.
4. FIELD VERIFY AND REMOVE ABANDONED/UNUSED UTILITY LINES AND RELATED ITEMS WITHIN PROJECT SITE-CAP/TERMINATE AT UNDERGROUND POC AS REQ'D-CUT/PATCH EX SURFACES TO REMAIN AS REQ'D FOR WORK.
5. FIELD VERIFY EX UTILITY BOXES/COVERS TO REMAIN AT NEW FINISH AREA-ADJUST TOP TO MATCH NEW FINISH.
6. FIELD VERIFY AND TAKE NECESSARY CARE TO PROTECT EX UNDERGROUND UTILITIES DURING CONSTRUCTION.
7. SEE PROJECT MANUAL FOR ADDITIONAL UNDERGROUND PIPING INFO AND REQS.

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01 LAYOUT CONTROL POINT-NORTHWEST BUILDING CORNER
02 4" CONC PAVING
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11 12" CMU FENCE WALL W/ CEMENT PLASTER FINISH/PRECAST CONC CAP
12 8" CMU RETAINING WALL W/ CEMENT PLASTER FINISH/PRECAST CONC CAP-CONC CURB AT LIBRARY SIDE
13 –
14 –
15 8" CMU P'LON W/ CEMENT PLASTER FINISH AND PRECAST CONC CAP AT STAIRS
16 8" CMU SCREEN WALL
17 TUBE STEEL FENCE ABOVE CMU FENCE WALL
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20 CONC DRIVEWAY APRON
21 CONC SEATING AREA
22 CONC CURB/GUTTER-MATCH EX CURB/GUTTER
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25 PAINT EX CONC CURB GREEN-CLEAN/PREP EX CURB AS REQ'D-"30 MIN BOOKSTORE PARKING ONLY" MARKING AT EACH STALL-4"H 3/4" STROKE WHITE REFLECTIVE LETTERS
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27 6" ASR SERVICE LINE BACKFLOW PREVENTER W/ FDC 36" MIN CLR WORKING SPACE AROUND FDC
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29 AREA DRAIN-SEE UTILITY/GRADING PLANS
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31 RELOCATED EX DOMESTIC WATER METER-SEE UTILITY PLAN
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35 WALK LIGHT-SEE ELEC SHEETS
36 ELEC/DATA PULL BOX-SEE ELEC SHEETS
37 WALL MOUNTED RECESSED STEP LIGHT-SEE ELEC SHEETS
38 CEMENT PLASTER FINISH ~~BRICK VENEER FINISH~~ ON EX CMU RETAINING WALL
39 CONNECT ROOF DRAIN LINES TO UNDERGROUND STORM DRAIN LINES-SEE UTILITY PLAN
40 ~~TREE WELL W/ 5' SQUARE IRON GRATE~~ SEE LANDSCAPE AND IRRIGATION SHEETS
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42 EX TRENCH DRAIN-REMOVE/REINSTALL PORTION OF DRAIN AS REQ'D FOR UG UTILITY WORK-SEE UTILITY PLAN
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49 STAIR HANDRAIL AT AISLE ACCESS
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51 BLDG COLUMN PEDESTAL-SEE FLOOR PLAN
52 RELOCATED EX WALK LIGHT-SEE ELEC SHEETS
53 SIGN "30 MIN BOOKSTORE PARKING ONLY" WITH DIRECTIONAL ARROW-SEE DETAIL
54 GREASE INTERCEPTOR-SEE UTILITY PLAN/PLUMBING SHEETS
55 CONC BENCH AT PLANTER 'D'
56 PATH OF TRAVEL DIRECTIONAL SIGN-MOUNTING TYPE VARIES AS NOTED-SEE DETAIL
57 ALUM FDC SIGN WALL MOUNTED "AUTOMATIC SPRINKLERS"
58 AC PAVING
59 COFFEE CART (NIC)
60 TRASH BIN (NIC)

SITE PLAN EXISTING KEYNOTES

71 EX BUILDING TO REMAIN
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CONSULTANT

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No	Date	Item
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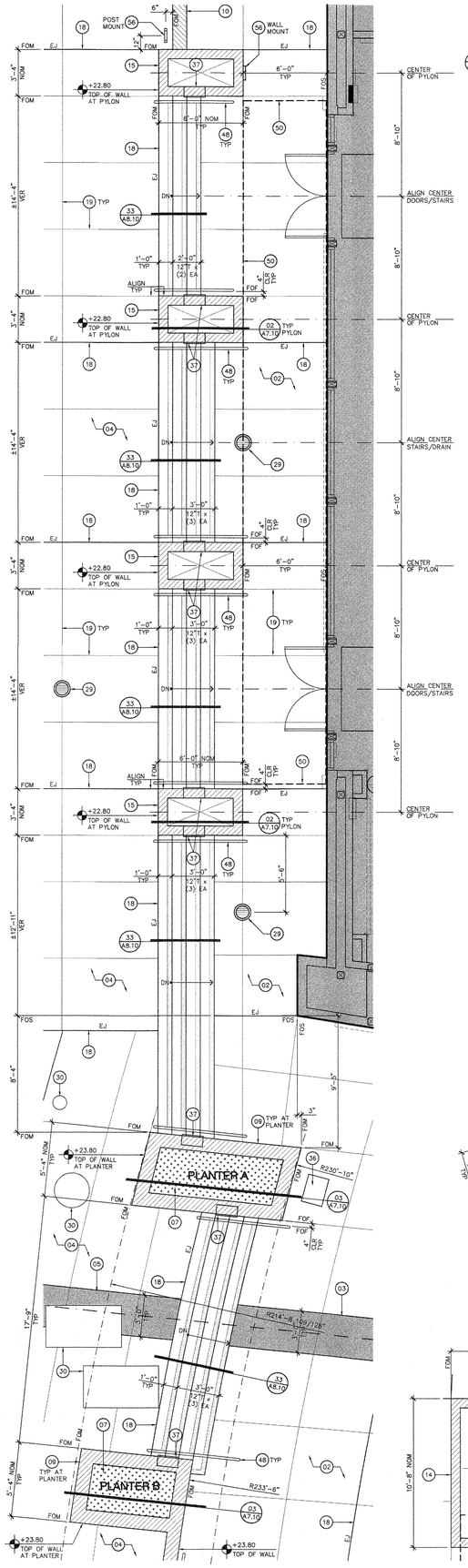
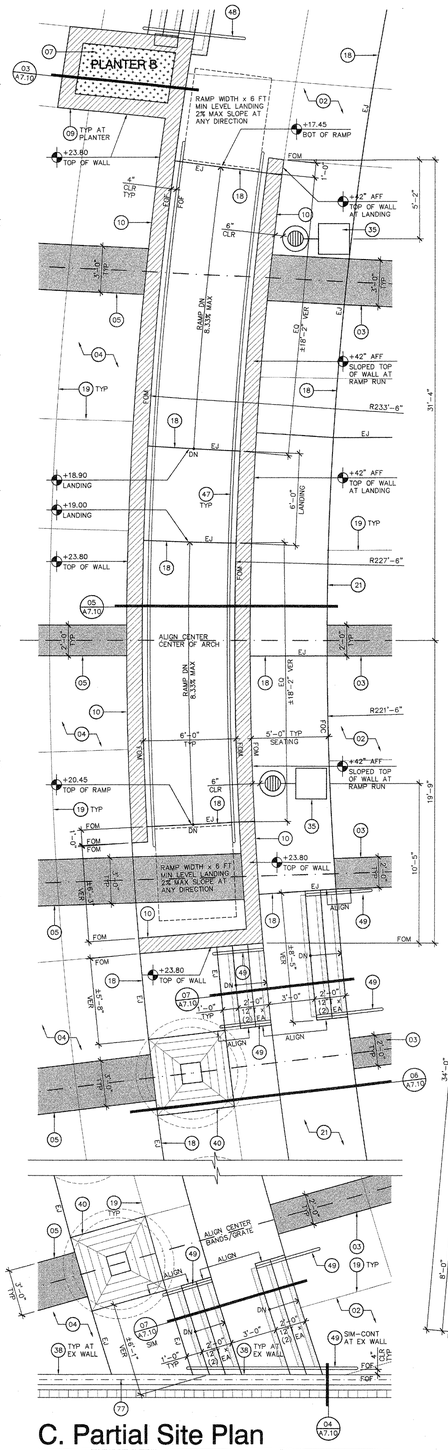
SITE PLAN

A1.20-A



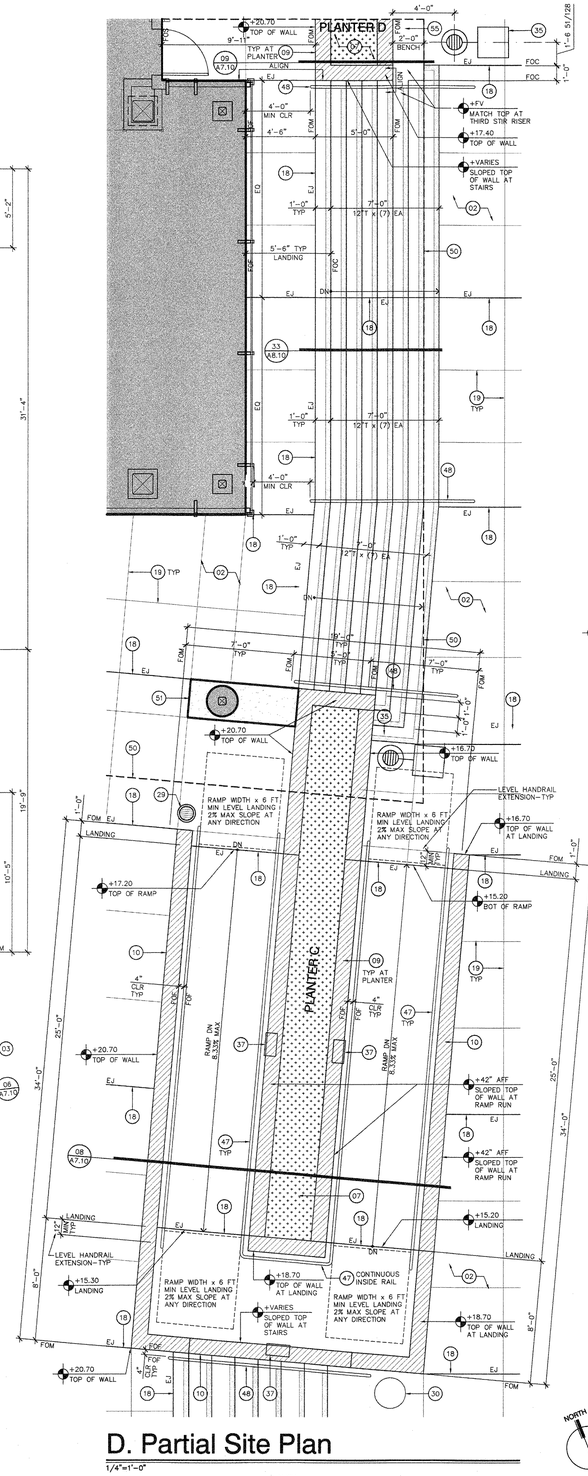
B. Partial Site Plan

1/4"=1'-0"



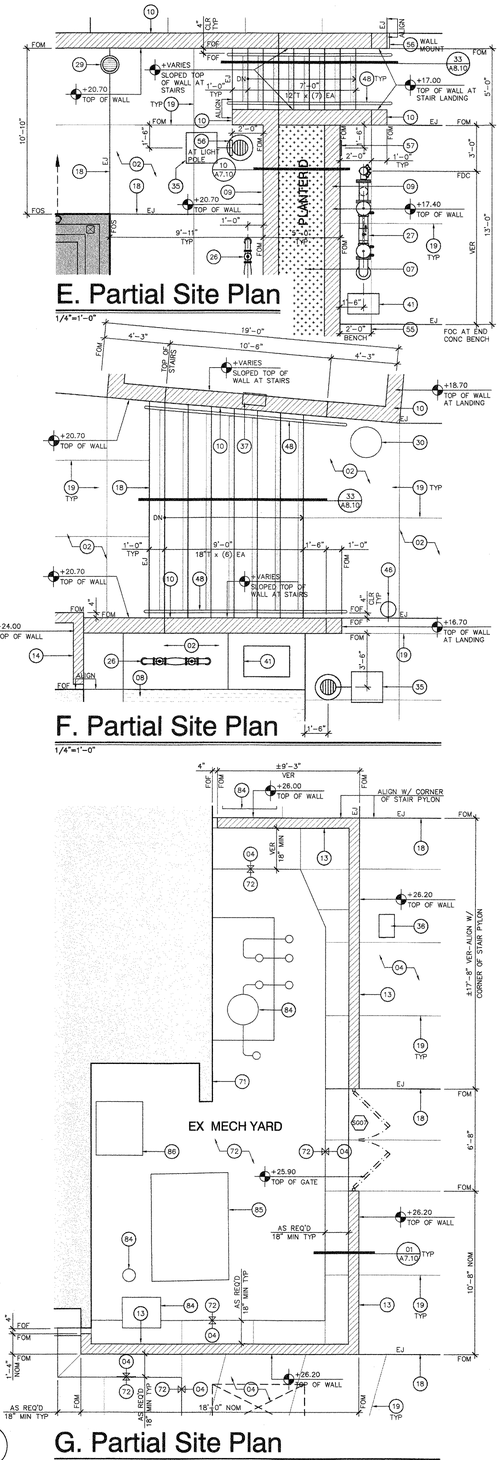
C. Partial Site Plan

1/4"=1'-0"



D. Partial Site Plan

1/4"=1'-0"



E. Partial Site Plan

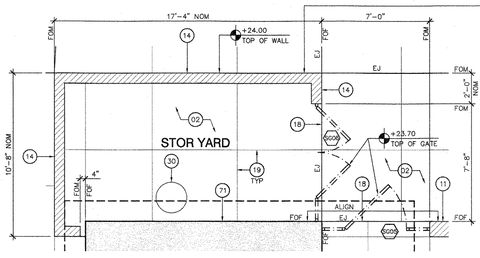
1/4"=1'-0"

F. Partial Site Plan

1/4"=1'-0"

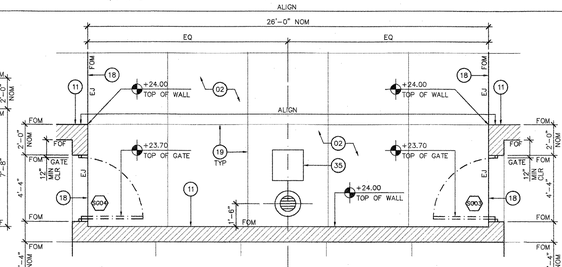
G. Partial Site Plan

1/4"=1'-0"



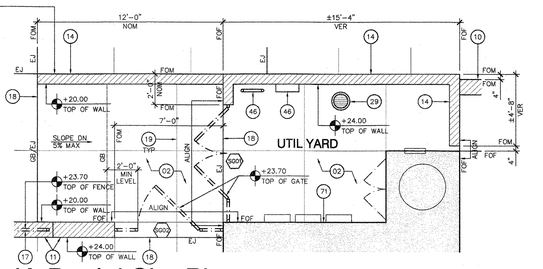
H. Partial Site Plan

1/4"=1'-0"



J. Partial Site Plan

1/4"=1'-0"



K. Partial Site Plan

1/4"=1'-0"

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3. SEE GEOTECHNICAL ENGINEERING AND GEOLOGIC/SEISMIC HAZARD INVESTIGATION REPORT FOR OVER-EXCAVATION/SITE PREPARATION AND OTHER INFO AND REQUIREMENTS.
4. FIELD VERIFY AND REMOVE ABANDONED/UNUSED UTILITY LINES AND RELATED ITEMS WITHIN PROJECT SITE--CAP/TERMINATE AT UNDERGROUND POC AS REQ'D--CUT/PATCH EX SURFACES TO REMAIN AS REQ'D FOR WORK.
5. FIELD VERIFY EX UTILITY BOXES/COVERS TO REMAIN AT NEW FINISH AREA--ADJUST TOP TO MATCH NEW FINISH.
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7. SEE PROJECT MANUAL FOR ADDITIONAL UNDERGROUND PIPING INFO AND REQS.

SITE PLAN KEYNOTES

01 LAYOUT CONTROL POINT-NORTHWEST BUILDING CORNER
02 4" CONC PAVING (11/A8.10) (12/A8.10)
03 4" EXPOSED AGGREGATE CONC PAVING W/ INTEGRAL COLOR-EJ TYP AT ALL BORDERS (11/A8.10)
04 6" CONC PAVING (11/A8.10) (12/A8.10)
05 6" EXPOSED AGGREGATE CONC PAVING W/ INTEGRAL COLOR-EJ TYP AT ALL BORDERS (11/A8.10)
06 AC PAVING PATCH-MATCH EX PAVING (16/A8.10)
07 PLANTER AREA
08 REGRADE/RELOCATE EX IRRIGATION AS REQ'D/ PATCH GRASS TO MATCH EX
09 12" CMU PLANTER WALL W/ THIN BRICK VENEER/PRECAST CONC CAP (03/A7.10) (08/A7.10) (09/A7.10) (10/A7.10)
10 12" CMU RETAINING WALL W/ THIN BRICK VENEER AND PRECAST CAP (05/A7.10) (12/A7.11) (14/A7.11)
11 12" CMU FENCE WALL W/ THIN BRICK VENEER AND PRECAST CONC CAP (11/A7.11)
12 8" CMU RETAINING WALL W/ THIN BRICK VENEER AND PRECAST CAP-CONC CURB AT LIBRARY SIDE (13/A7.11)
13 8" CMU MECH YARD WALL W/ THIN BRICK VENEER AND PRECAST CAP (01/A7.10)
14 8" CMU FENCE WALL W/ THIN BRICK VENEER AND PRECAST CONC CAP (01/A7.10) SIM
15 8" CMU PYLON W/ THIN BRICK VENEER AND PRECAST CONC CAP AT STAIRS (02/A7.10)
16 8" CMU SCREEN WALL (01/A7.10) SIM
17 TUBE STEEL FENCE ABOVE CMU FENCE WALL (44/A8.10)
18 CONC PAVING EXPANSION JOINT-SEE TYP PAVING AND WALL DETAILS FOR ADDITIONAL EJ LOCATIONS (15/A8.10)
19 CONC PAVING CONTROL JOINT (10/A8.10)
20 CONC DRIVEWAY APRON (53/A8.11)
21 CONC SEATING AREA (06/A7.10)
22 CONC CURB/GUTTER-MATCH EX CURB/GUTTER (13/A8.10)
23 CONC WHEEL STOP (34/A8.11)
24 PAINT EX CONC CURB RED-CLEAN/PREP EX CURB AS REQ'D
25 PAINT EX CONC CURB GREEN-CLEAN/PREP EX CURB AS REQ'D-"30 MIN BOOKSTORE PARKING ONLY" MARKING AT EACH STALL-4"H 3/4" STROKE WHITE REFLECTIVE LETTERS
26 DOMESTIC WATER BACKFLOW PREVENTER-SEE UTILITY PLAN
27 6" ASR SERVICE LINE BACKFLOW PREVENTER W/ FDC 36" MIN CLR WORKING SPACE AROUND FDC (41/A8.11)
28 CATCH BASIN-SEE UTILITY/GRADING PLANS (14/A8.11)
29 AREA DRAIN-SEE UTILITY/GRADING PLANS (15/A8.11)
30 EX UTILITY BOX/COVER TO REMAIN-ADJUST TOP TO MATCH NEW FINISH-SEE UTILITY/GRADING PLANS
31 RELOCATED EX DOMESTIC WATER METER-SEE UTILITY PLAN
32 PATCH CONC PAVING TO MATCH EX AT NEW UG CHILLED WATER LINES-FV LOCATION/AREA AS REQ'D PER PLANS SEE PARTIAL SITE PLAN A/A1.00 FOR CONTINUATION
33 TRANSFORMER/SWITCH GEAR OVER CONC PAD-SEE ELEC SHEETS
34 BOLLARD LIGHT-SEE ELEC SHEETS (23/A8.11)
35 WALK LIGHT-SEE ELEC SHEETS (22/A8.11)
36 ELEC/DATA PULL BOX-SEE ELEC SHEETS (13/A8.11)
37 WALL MOUNTED RECESSED STEP LIGHT-SEE ELEC SHEETS
38 BRICK VENEER FINISH ON EX CMU RETAINING WALL (04/A7.10)
39 CONNECT ROOF DRAIN LINES TO UNDERGROUND STORM DRAIN LINES-SEE UTILITY PLAN
40 TREE WELL W/ 5' SQUARE IRON GRATE SEE LANDSCAPE AND IRRIGATION SHEETS (06/A7.10)
41 WATER METER-SEE UTILITY PLAN
42 EX TRENCH DRAIN-REMOVE/REINSTALL PORTION OF DRAIN AS REQ'D FOR UG UTILITY WORK-SEE UTILITY PLAN
43 EX ELEC/DATA BOX-REMOVE/REINSTALL AS REQ'D FOR UG UTILITY WORK-SEE UTILITY PLAN
44 REINSTALL CL FENCE AT EX GATE (42/A8.10)
45 4" STRIPING AT 45° PARKING (30/A8.11)
46 MISC UTILITY-SEE UTILITY PLAN
47 ACCESSIBLE RAMP/HANDRAIL (25/A8.10)
48 STAIR HANDRAIL (34/A8.10)
49 STAIR HANDRAIL AT AISLE ACCESS (07/A7.10)
50 LINE OF ROOF/TRELLIS OVERHANG-SEE PLANS
51 BLDG COLUMN PEDESTAL-SEE FLOOR PLAN
52 RELOCATED EX WALK LIGHT-SEE ELEC SHEETS
53 SIGN "30 MIN BOOKSTORE PARKING ONLY" WITH DIRECTIONAL ARROW-SEE DETAIL 46 (22/A8.80) SIM
54 GREASE INTERCEPTOR-SEE UTILITY PLAN/PLUMBING SHEETS
55 CONC BENCH AT PLANTER 'D' (09/A7.10)
56 PATH OF TRAVEL DIRECTIONAL SIGN-MOUNTING TYPE VARIES AS NOTED-SEE DETAIL 101 (25/A8.80)
57 ALUM FDC SIGN WALL MOUNTED "AUTOMATIC SPRINKLERS" FDC (53/A8.80)
58 -
59 COFFEE CART (NIC)
60 TRASH BIN (NIC)

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83 EX LIGHT STANDARD
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86 EX SWITCHBOARD
87 EX TREE
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89 EX CONC ACCENT BAND
90 INDICATES NUMBER OF PARKING STALLS SHOWN FOR REF ONLY (#)

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PARTIAL SITE PLANS

A1.21

COUNTY LIBRARY
(NOT PART OF CAMPUS)

TYP EX 4" RD LEADERS

02 LEARNING RESOURCE CENTER
A# 03-108606

01 ADMINISTRATION
A# 03-108606

EX 12"SD SDR 35

EX 12" SD SDR 35

EX 6" SS VCP

EX WRNG LINE-FV

EX MECH YARD

EX 1-1/4" CW

EX 2" GAS PE PIPE

EX CABLE

EX IRRIG

EX WATER FOUNTAIN WATER SUPPLY (2)-8"/(4)-4"/(1)-2"

EX 6" SD SDR35

EX GAS PIPE

EX COTG

EX 4" XHCI

EX GAS PIPE

EX 4" CO TO GRADE

06 SCIENCE
A# 03-110101
EX FF=+22.60

105 S.T.E.M.
A# 03-113084
EX FF=+21.30

58 STUDENT SUPPORT SERVICE

07 STAFF HOUSE

STORAGE SHED

14 WCAT DORMS BLDG A

15 WCAT DORMS BLDG B
A# 24517
EX FF=+17.35
(FV)

16 WCAT DORMS BLDG C
A# 24517
EX FF=+16.81
(FV)

17 WCAT DORMS BLDG D
A# 24517
EX FF=+16.83
(FV)

18 WCAT DORMS BLDG E

19 T-DORMS

20 RESIDENCE LOUNGE

EX 3" CW

EX 4" SS VCP

EX 6" SD CONC PIPE

EX 8" SD CONC PIPE

EX 10" SD CONC PIPE

EX 4" CW

EX 2" CW

EX GAS

EX CB

EX MH

EX WM

EX XFMR

EX WATER

EX CW WATER METER/BOX-FV

EX 8" CW MAIN (FV)

WILD CAT WAY

TO EX DRAINAGE CHANNEL

Φ±14.50 (FV)
EX SD INV

Φ±13.02 (FV)
EX SS INV

Φ±12.33 (FV)
EX SD INV

Φ±11.80 (FV)
EX SD INV

Φ±11.41 (FV)
EX SD INV

Φ±10.89 (FV)
EX SD INV

EX 10"SD CONC PIPE

Site Utility Demolition Plan

1"=10'-0"

NORTH

GENERAL SITE/UTILITY PLAN NOTES

1. ALL EXISTING ITEMS, LOCATIONS AND SIZES ARE INDICATED AS ADVISORY. FIELD VERIFY ACTUAL LOCATIONS, SIZES AND CONDITIONS AS REQUIRED FOR INTENDED WORK AND MAKE ADJUSTMENTS ACCORDINGLY.
2. SEE UTIL, ELEC, MECH, PLBG AND LANDSCAPE/IRRIGATION SHEETS FOR ADDITIONAL CUT/PATCH AT EX SURFACES AS REQ'D FOR WORK-FINISH SURFACES TO MATCH ADJACENT SURFACES.
3. SEE GEOTECHNICAL ENGINEERING AND GEOLOGIC/SEISMIC HAZARD INVESTIGATION REPORT FOR OVER-EXCAVATION/SITE PREPARATION AND OTHER INFO AND REQUIREMENTS.
4. FIELD VERIFY AND REMOVE ABANDONED/UNUSED UTILITY LINES AND RELATED ITEMS WITHIN PROJECT SITE-CAP/TERMINATE AT UNDERGROUND POC AS REQ'D--CUT/PATCH EX SURFACES TO REMAIN AS REQ'D FOR WORK.
5. FIELD VERIFY EX UTILITY BOXES/COVERS TO REMAIN AT NEW FINISH AREA-ADJUST TOP TO MATCH NEW FINISH.
6. FIELD VERIFY AND TAKE NECESSARY CARE TO PROTECT EX UNDERGROUND UTILITIES DURING CONSTRUCTION.
7. SEE PROJECT MANUAL FOR ADDITIONAL UNDERGROUND PIPING INFO AND REQS.

UTILITY PLAN LEGEND

- EX STORM DRAIN LINES
- EX SEWER LINES
- EX WATER LINES
- EX HVAC LINES
- EX IRRIGATION LINES
- EX GAS LINES
- EX UTIL DEMO

NOTES:
1. SEE ELEC SHEETS FOR SITE ELEC/DATA PLANS.
2. SEE LANDSCAPE/IRRIGATION SHEETS FOR IRRIGATION PLANS.
3. SEE PARTIAL SITE PLAN A/A1.00 FOR CONTINUATION OF HVAC HYDRONIC LINES TO CAMPUS MAIN CHILLER.

SITE UTILITY DEMO PLAN KEYNOTES

01 REMOVE EX STORM DRAIN CATCH BASIN
02 REMOVE EX STORM DRAIN LINE-CAP AT EX POC
03 REMOVE EX SEWER AND RELATED ITEMS-CAP AT EX POC
04 REMOVE EX WATER AND RELATED ITEMS-CAP AT EX POC
05 REMOVE EX GAS AND RELATED ITEMS-CAP AT EX POC
06 FV/REMOVE EX ABANDONED/UNUSED UTILITY AND RELATED ITEMS-FV/CAP/TERMINATE AT EX POC
07 REMOVE EX ELEC/DATA/CABLE-SEE ELEC SHEETS
08 REMOVE EX ELEC TRANSFORMER-SEE ELEC SHEETS
09 RELOCATE EX WATER METER, REROUTE EX WATER MAIN AS REQ'D-SEE SITE PLAN FOR NEW LOCATION
10 FV/EXTEND/RELOCATE EX SEWER COTG AS REQ'D PER PLAN

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DSA

IDENTIFICATION STAMP
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FILE NO. 15-C2
APP. NO. 03-115449
AC ___ FLS ___ SS ___
DATE SEP 16 2015

PROJECT INFO

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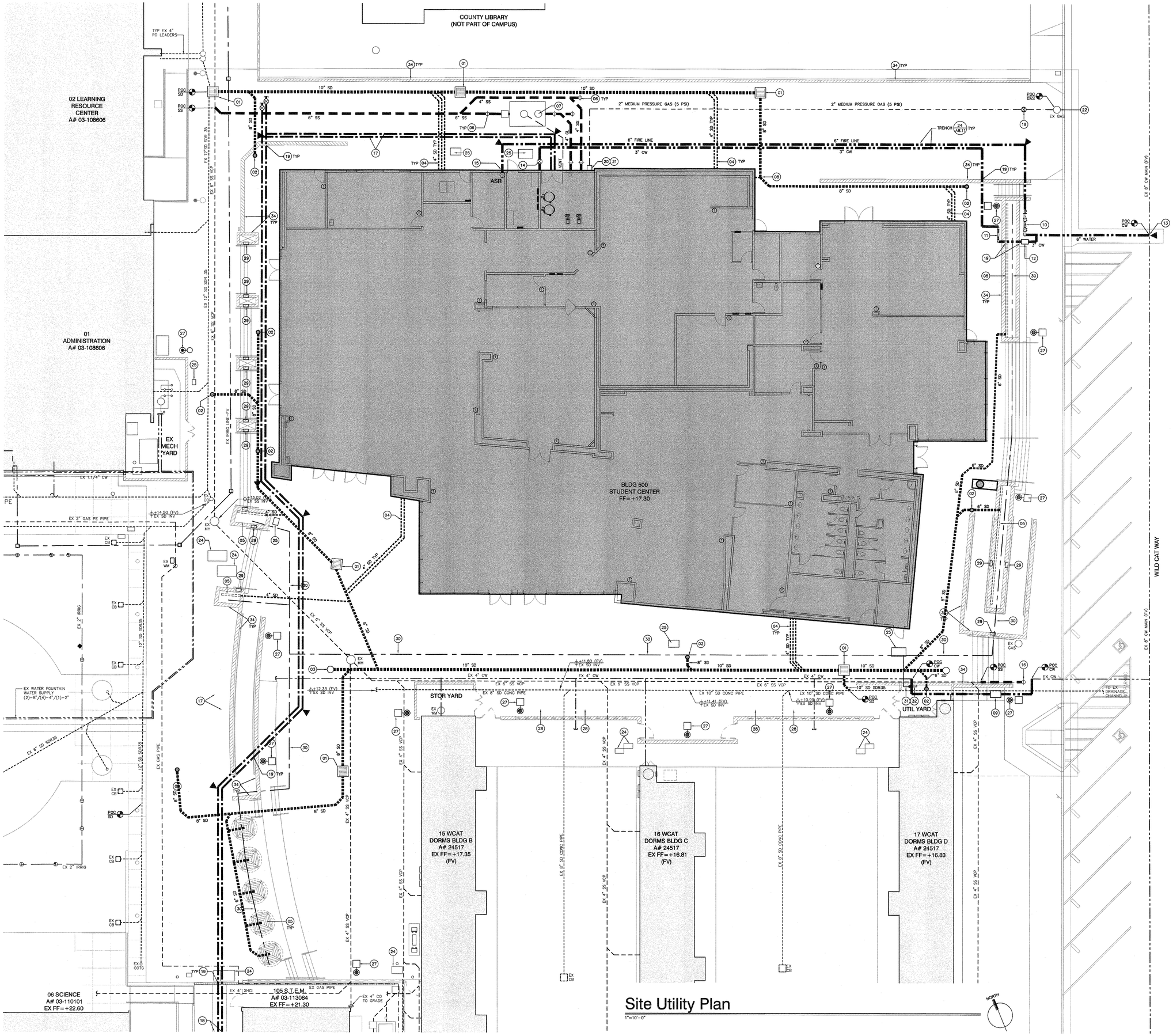
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

SITE UTILITY DEMOLITION PLAN

A1.30



Site Utility Plan

1"=10'-0"

GENERAL SITE/UTILITY PLAN NOTES

1. ALL EXISTING ITEMS, LOCATIONS AND SIZES ARE INDICATED AS ADVISORY. FIELD VERIFY ACTUAL LOCATIONS, SIZES AND CONDITIONS AS REQUIRED FOR INTENDED WORK AND MAKE ADJUSTMENTS ACCORDINGLY.
2. SEE UTIL, ELEC, MECH, PLBG AND LANDSCAPE/IRRIGATION SHEETS FOR ADDITIONAL CUT/PATCH AT EX SURFACES AS REQ'D FOR WORK-FINISH SURFACES TO MATCH ADJACENT SURFACES.
3. SEE GEOTECHNICAL ENGINEERING AND GEOLOGIC/SEISMIC HAZARD INVESTIGATION REPORT FOR OVER-EXCAVATION/SITE PREPARATION AND OTHER INFO AND REQUIREMENTS.
4. FIELD VERIFY AND REMOVE ABANDONED/UNUSED UTILITY LINES AND RELATED ITEMS WITHIN PROJECT SITE-CAP/TERMINATE AT UNDERGROUND POC AS REQ'D-CUT/PATCH EX SURFACES TO REMAIN AS REQ'D FOR WORK.
5. FIELD VERIFY EX UTILITY BOXES/COVERS TO REMAIN AT NEW FINISH AREA-ADJUST TOP TO MATCH NEW FINISH.
6. FIELD VERIFY AND TAKE NECESSARY CARE TO PROTECT EX UNDERGROUND UTILITIES DURING CONSTRUCTION.
7. SEE PROJECT MANUAL FOR ADDITIONAL UNDERGROUND PIPING INFO AND REQS.

UTILITY PLAN LEGEND

- EX STORM DRAIN LINES
- EX SEWER LINES
- EX WATER LINES
- EX HVAC LINES
- EX IRRIGATION LINES
- EX GAS LINES
- SD SDR35 — STORM DRAIN LINES– VERIFY SIZE ON PLANS
- 6" SS SDR35 — SEWER LINES– VERIFY SIZE ON PLANS
- CW PVC 900/ FIRELINE PVC 900 — WATER LINES– VERIFY SIZE ON PLANS
- HVAC LINES HYDRONIC LINES– SEE PLUMBING SHEETS
- IRRIGATION LINES– SEE L/I SHEETS
- GAS LINE– SEE PLANS AND SPECS
- DRAIN PIPE IN PLANTER– SEE PLANS AND SPECS
- POC XX — POINT OF CONNECTION TO EXISTING UTILITY LINE– FIELD VERIFY LOCATION AND SIZE PRIOR TO WORK BEING PERFORMED– POT HOLE AND EXPLORE AS NECESSARY TO CONFIRM SIZES AND LOCATIONS
- TYPICAL THRUST BLOCKS– SEE DETAILS 25 A8.11

NOTES:
1. SEE ELEC SHEETS FOR SITE ELEC/DATA PLANS.
2. SEE LANDSCAPE/IRRIGATION SHEETS FOR IRRIGATION PLANS.
3. SEE PARTIAL SITE PLAN A/A1.00 FOR CONTINUATION OF HVAC HYDRONIC LINES TO CAMPUS MAIN CHILLER.

TYPICAL DETAILS

12 A8.11	SOV BOX	13 A8.11	ELEC PB	14 A8.11	CATCH BASIN
15 A8.11	AREA DRAIN	24 A8.11	TRENCH	25 A8.11	THRUST BLOCK
42 A8.11	ASR SERVICE CONNECTION	43 A8.11	FIRE SERVICE LINE INTO BLDG	5 S1.04	TYP CONDUIT/ PIPE INTO BLDG

SITE UTILITY PLAN KEYNOTES

01 STORM DRAIN CATCH BASIN (14 A8.11)
02 STORM DRAIN AREA DRAIN (15 A8.11)
03 STORM DRAIN COTG
04 ROOF DRAIN LINE CONNECTION TO STORM DRAIN
05 DRAIN PIPE IN PLANTER
06 SEWER COTG–SEE PLUMBING SHEETS
07 GREASE INTERCEPTOR–SEE PLUMBING SHEETS
08 CONNECT DOWN SPOUT TO UNDERGROUND STORM DRAIN LINE
09 RELOCATE EX DOMESTIC WATER METER (13 A8.11) REROUTE EX WATER MAIN AS REQ'D
10 6" ASR SERVICE LINE BACKFLOW PREVENTER W/ FDC–36" MIN CLR WORKING SPACE AT FDC (41 A8.11)(P2.0)
11 3" DOMESTIC WATER BACKFLOW PREVENTER
12 3" DOMESTIC WATER METER (13 A8.11)
13 POC AT EX COUNTY WATER MAIN–FV EX WATER LINE
14 DOMESTIC WATER INTO BLDG–SEE PLUMBING SHEETS
15 ASR INTO BLDG–SEE FIRE PROTECTION SHEETS AND FLOOR PLAN FOR LOCATION (43 A8.11)
16 FV/EXTEND/RELOCATE EX SEWER COTG
17 CHWS/CHWR LINES–SEE MECH SHEETS
18 CHWS/CHWR LINES TO CAMPUS MAIN CHILLER SEE PARTIAL SITE PLAN FOR CONTINUATION (A A1.00)
19 UTILITY LINE THROUGH WALL/ FOOTING– COORDINATE PENETRATION IN THE FIELD
20 GAS METER
21 GAS SERVICE INTO BLDG–SEE PLUMBING SHEETS
22 POC AT EX GAS VALVE–FV
23 –
24 EX ELEC/DATA BOX TO REMAIN–ADJUST TOP TO MATCH NEW FINISH–SEE ELEC SHEETS
25 ELEC/DATA PULL BOX–SEE ELEC SHEETS (13 A8.11)
26 BOLLARD LIGHT–SEE ELEC SHEETS (23 A8.11)
27 WALK LIGHT STANDARD–SEE ELEC SHEETS (22 A8.11)
28 TRANSFORMER/SWITCH GEAR–SEE ELEC SHEETS
29 WALL MOUNTED RECESSED STEP LIGHT–SEE ELEC SHEETS
30 IRRIGATION LINE
31 IRRIGATION BFP
32 IRRIGATION CONTROL PANEL
33 –
34 PERFORATED DRAIN PIPE AT RETAINING WALL–SEE STRUCT SHEETS S1.06 AND S1.07 FOR LOCATIONS AND REQS
35 –

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SITE UTILITY PLAN

A1.40

INTERIOR FINISH SCHEDULE

SEE REFLECTED CEILING PLAN FOR CEILING TYPE/FINISH

FLOOR

1	CARPET TILE- CT-1	7	PAVER TILE (43/A8.51)
2	LCMT-1 (31/A8.51)	8	6X6 QUARRY TILE SIM (43/A8.51)
3	COVED SHEET RUBBER – RT-2	9	EXPOSED CONCRETE
4	36X36 RUBBER TILE RT-1	10	CARPET -CT-2
5	12x12 VCT		
6	12x12 SDVCT		

BASE

1	4" RWB		
2	4" COVED GWT-1 (31/A8.51)		
3	WOOD WALL SYSTEM (51/A8.51)		
4	VTS OVER 5/8" GYP BD	10	GWT-1 (31/A8.51)
5	5/4" AC PWD OVER 5/8" GYP BD– BEVELED EDGES (24/A8.51)	11	GWT-2 (31/A8.51)
6	STONE VENEER (43/A8.41)	12	GWT-3 (31/A8.51)

WALLS

1	GYP BD	7	EXPOSED STRUCTURAL MEMBER– SEE DTLS
2	SLATWALL SYSTEM	8	FRP OVER 5/8" GYP BD (25/A8.51)
3	WOOD WALL SYSTEM (51/A8.51)	9	STAINLESS STEEL WALL FINISH (23/A8.51)
4	VTS OVER 5/8" GYP BD	10	GWT-1 (31/A8.51)
5	5/4" AC PWD OVER 5/8" GYP BD– BEVELED EDGES (24/A8.51)	11	GWT-2 (31/A8.51)
6	STONE VENEER (43/A8.41)	12	GWT-3 (31/A8.51)

FINISH

A	PAINT-EGGSHELL	E	BROOM FINISH/ SEALER
B	PAINT-SEMI GLOSS	F	PAINT-ON METAL
C	FACTORY		
D	TRANSPARENT FINISH OVER STAIN		

NO	ROOM	FLOOR MTL	FLOOR FIN	BASE MTL	BASE FIN	WALLS NORTH MTL	WALLS NORTH FIN	WALLS EAST MTL	WALLS EAST FIN	WALLS SOUTH MTL	WALLS SOUTH FIN	WALLS WEST MTL	WALLS WEST FIN	WALLS WAINS MTL	WALLS WAINS FIN	JAMB/ TRIM FIN	Remarks
500	STUDENT COMMONS	1/7	C/C	1	C	3/B	C/C	6	C	6/7	C	6/7	C	–	–	B	*
500A	TV LOUNGE	1/7	C/C	1	C	–	–	1/4	A/C	4/7	C/B	6	C	–	–	B	*
500B	GAME AREA	1/7	C/C	1	C	4/6	C/C	1/4	A/C	–	–	1/6	A/C	–	–	B	*
500C	ENTRY VESTIBULE	7	C	1	C	3	C	3/7	C	10/A	A/C	–	–	–	–	B	*
500D	RESTROOM ALCOVE	7	C	1	C	6	C	1/6	A/C	1	A	1/6	A/C	–	–	B	*
501	DINING	4/7	C/C	1	C	11/4	A/C	1/10/3	A/C/C	6	C	1/4	A/C	–	–	B	*
501A	STAFF DINING	1	C	1	C	4	C	4	C	4	C	1	A	–	–	B	*
501B	DINING STORAGE	4	C	1	C	1	A	1	A	1	A	1	A	–	–	B	*
501C	DINING ALCOVE	4	C	1	C	1/10	A/C	11	C	–	–	1	A	–	–	B	*
502	FOOD SERVICE	3/9	C/E	3	C	1/8	B/C	8/9	C/C	1/10/3	B/C/C	1/10/7	B/C/C	–	–	B	*
503	KITCHEN	B/9	C/E	1	C	1/9	B/C	1/8	B/C	1/8	B/C	1/8	B/C	–	–	B	*
503A	KITCHEN OFFICE	5	C	1	C	4	C	1	B	1	B	1	B	–	–	B	*
503B	DISHWASH	8	C	4	C	8/9	C/C	8	C	8	C	9	C	–	–	B	*
503C	CHANGE ROOM	8	C	4	C	1	B	1	B	1	B	1	B	–	–	B	*
503D	CUSTODIAL	8	C	4	C	12	C	12	C	12	C	12	C	–	–	B	*
503E	RESTROOM	8	C	4	C	12	C	12	C	12	C	12	C	–	–	B	*
503F	DRY STORAGE	8	C	4	C	8	C	8	C	8	C	8	C	–	–	B	*
504	MAIL ROOM	5	C	1	C	1	A	1/4	A/C	1/4	A/C	1	A	–	–	B	*
505	ASB DIRECTOR	10	C	1	C	1	A	4	A	1	A	1	A	–	–	B	*
506	ASB OFFICE	5	C	1	C	1	A	1/4	A/C	1	A	1/4	A/C	–	–	B	*
506A	ASB STORAGE	5	C	1	C	1	A	1	A	1	A	1	A	–	–	B	*
507	ELECTRICAL	6	C	5	B	5	B	5	B	5	B	5	B	–	–	B	*
510	BOOKSTORE	1	C	1	C	1/2	A/C	1/2	A/C	1/7	A/C	–	–	–	–	B	*
510A	SALES	1/5	C/C	1	C	–	–	–	–	2	C	1/2	A/C	–	–	B	*
510B	DELIVERY	1/5	C/C	1	C	1	A	1	A	1/2	A/C	1/4	A/C	–	–	B	*
510D	DISPLAY	1	C	1	C	2	C	2	C	–	–	2	C	–	–	B	*
511	OFFICE	10	C	1	C	1/4	A/C	1	A	4	C	1/4	A/C	–	–	B	*
512	DIRECTOR	10	C	1	C	1	A	1	A	4	C	4	C	–	–	B	*
515	CUSTODIAL	2	C	2	C	12	C	12	C	12	C	12	C	–	–	B	*
516	MEN	2	C	2	C	12	C	12	C	12	C	12	C	–	–	B	*
516A	PLUMBING CHASE	9	E	1	C	1	B	1	B	1	B	1	B	–	–	B	*
517	WOMEN	2	C	2	C	12	C	12	C	12	C	12	C	–	–	B	*
520	SECURITY OFFICE	1	C	1	C	4	C	4	C	4	C	4	C	–	–	B	*
521	DATA	6	C	1	C	5	B	5	B	5	B	5	B	–	–	B	*
522	ELECTRICAL	6	C	1	C	5	B	5	B	5	B	5	B	–	–	B	*
523	BOILER	9	E	1	C	1	B	1	B	1	B	1	B	–	–	B	*

JOINT SEALANT SCHEDULE

INSTALL SEALANT INDICATED IN JOINTS FITTING DESCRIPTIONS AND LOCATIONS LISTED AS WELL AS IN LOCATIONS IDENTIFIED BY DRAWING DESIGNATIONS IN FIRST COLUMN BELOW

No	Joint Sealer	Description
ES1	TWO PART POLYSULFIDE POURABLE SEALANT	EXTERIOR JOINTS IN HORIZONTAL SURFACES OF CONCRETE WHERE SLOPE IS LESS THAN 1/8" /FT USE BULKHEAD POUR. WHERE SLOPE IS GREATER THAN 1/8"/FT USE GUN–GRADE MATERIAL.
ES2	ONE–PART MILDEW RESISTANT SILICONE SEALANT	INTERIOR JOINTS IN VERTICAL SURFACES OF CERAMIC TILE IN TOILET ROOMS AND SIMILAR USES AND HORIZONTAL NON TRAFFIC SURFACES OF CERAMIC TILE TOILET ROOMS AND SIMILAR USES
ES3	MULTI–PART POURABLE URETHANE SEALANT	INTERIOR JOINTS IN HORIZONTAL SURFACES OF TILE WITH TRAFFIC SURFACES
ES4	ONE–PART NEUTRAL CURE SILICONE SEALANT	EXTERIOR AND INTERIOR JOINTS IN VERTICAL SURFACES OF CONCRETE AND MASONRY; BETWEEN CONCRETE MASONRY AND STONE; BETWEEN METAL AND CONCRETE, MORTAR, OR STONE. INTERIOR AND EXTERIOR PERIMETER OF JOINTS OF METAL FRAMES IN EXTERIOR WALLS; EXTERIOR OVERHEAD JOINTS, ROOFING SHEET METAL JOINTS, ETC.
ES5	ONE–PART NEUTRAL CURE SEALANT	EXPOSED JOINTS WITHIN GLAZED CURTAIN WALL FRAMING SYSTEMS, SKYLIGHT FRAMING SYSTEMS, AND ALUM ENTRANCE FRAMING SYSTEMS (NOT TO BE USED ON EIFS)
ES6	ACRYLIC–EMULSION SEALANT	INTERIOR JOINTS IN FIELD–PAINTED VERTICAL AND OVERHEAD SURFACES AT PERIMETER OF ELEVATOR DOOR FRAMES AND HOLLOW METAL DOOR FRAMES, IN GYPSUM DRYWALL, PLASTER, CONCRETE, AND CONCRETE MASONRY, AND ALL OTHER JOINTS NOT INDICATED OTHERWISE.
ES7	ACOUSTICAL JOINT SEALANT	JOINTS IN AREAS REQUIRED TO REDUCE AIRBORNE SOUND TRANSMISSION INCLUDING WALLS AND ELECTRICAL BOXES
ES8	BUTYL SEALANT TAPE–DBL FACED	1" WIDE DBL FACED SEALANT TAPE METAL ROOFING
ES9	ONE–PART NEUTRAL CURE SILICONE SEALANT	EIFS SEALANT AS RECOMMENDED BY MFR.
FRS1	FIRE RESISTIVE JOINT SEALANT	SINGLE COMPONENT NEUTRAL CURE SILICON FIRESTOP SEALANT.

ACCESSORY SCHEDULE

TYPICAL DETAILS

(53/A8.20) TYPICAL BACKING AT SURFACE MTD ACCESSORY
(54/A8.20) TYPICAL RECESSED ACCESSORY FRAMING
(55/A8.07) TYPICAL ACCESSORY MOUNTING HEIGHTS
(31/A8.80) TYPICAL DOOR SIGN INSTALLATION

No	Mfr/Model No	Description	Mtg Ht	Dtls
01	"BOBRICK" NO B–6806.99 SERIES(PEENED)	GRAB BAR SET W/ CONCEALED MOUNTING (SIDE 48", REAR 36")	SEE DET	53/A8.20 *
02	"BOBRICK" NO B–3094	RECESSED/SANITARY NAPKIN DISPOSAL AND TOILET TISSUE DISPENSER	SEE DET	55/A8.00 54/A8.20
03	"BOBRICK" NO B–301	RECESSED TOILET SEAT COVER DISPENSER	SEE DET	55/A8.00 54/A8.20
04	"BOBRICK" NO B–3574	SURFACE MTD TOILET PAPER/SEAT COVER DISPENSER/SANITARY NAPKIN DISPOSAL AND TOILET TISSUE DISPENSOR(PARTITION SINGLE)	SEE DET	55/A8.00 *
05	"BOBRICK" NO B–357	PARTITION MTD/SEAT COVER DISPENSER/SANITATION NAPKIN DISPOSAL AND TOILET TISSUE DISPENSER (PARTITION DUAL)	SEE DET	55/A8.00 *
07	SEE PROJECT MANUAL	SOLID PLASTIC OVERHEAD BRACED TOILET PARTITIONS	SEE DET	25/A8.90 53/A8.20
08	SEE PROJECT MANUAL	SOLID PLASTIC SURFACE MTD URINAL SCREEN	SEE DET	25/A8.90 53/A8.20
09	"BOBRICK" 290 SERIES – CUSTOM SIZE	GLASS MIRROR W/ STAINLESS STEEL ANGLE FRAME	SEE INT ELEV	53/A8.20 50/A8.00
10	"BOBRICK" NO B–3888	RECESSED MULTI–ROLL TOILET TISSUE DISPENSER	SEE DET	55/A8.00 54/A8.20
11	"BOBRICK" NO B–822	COUNTER MTD LIQUID SOAP DISPENSER – INSTALL PER MFR INSTRUCTION. VERIFY FINAL LOCATION WITH ARCHITECT	SEE DET	* *
12	"BOBRICK" NO B–3944	RECESSED CONVERTIBLE PAPER TOWEL DISPENSER/WASTE RECEPTACLE	SEE DET	55/A8.00 54/A8.20
13	"BOBRICK" NO B–224 x 36" MIN	UTILITY SHELF W/ MOP, BROOM HOLDERS AND RAG HOOKS	+4'–6"	42/A8.90 53/A8.20
15	"BOBRICK" NO B–682	SURFACE MTD HAT AND COAT HOOK– WHEN PARTITION MTD– MOUNT ON STALL DOOR +4'–0" AFF AT ACCESSIBLE STALL +5'–0" AFF AT NON ACCESSIBLE STALLS	AS NOTED	* *
16	"BOBRICK" B –290(24X48)	GLASS MIRROR WITH STAINLESS STEEL ANGLE FRAME	SEE DET	55/A8.00 53/A8.20
17	"BOBRICK" NO B–2112	SURFACE MTD SOAP DISPENSER	SEE DET	55/A8.00 53/A8.20
18	"BOBRICK" NO 3471	RECESSED TOILET PAPER/SEAT COVER DISPENSER (PARTITION SINGLE)	SEE DET	55/A8.00 *
19	"BOBRICK"–NO B–26212	SURFACE MTD PAPER TOWEL DISPENSER	+3'–4"	55/A8.00 53/A8.20
21	SEE PROJECT MANUAL	RECESSED DISPLAY CABINET W/ TEMPERED GLASS HINGED DOORS, LIGHTS – SEE DETAILS (SIZE 3'X6')	SEE DET	23/A8.90 *
24	SEE DETAILS	"EMERGENCY EXIT ONLY" SIGN	SEE DET	24/A8.80 53/A8.20
25	SEE DETAILS	"NOT AN EXIT" SIGN	SEE DET	16/A8.80 53/A8.20
26	SEE DETAILS	ROOM SIGN W/ BULLETIN BOARD	SEE DET	34/A8.80 53/A8.20
27	SEE PROJECT MANUAL	METAL LETTERS, SEE ELEVATIONS FOR LOCATION/SIZE/VERBIAGE	SEE ELEV	41/A8.80 14/A8.90
28	SEE DETAILS	TOILET IDENTITY SIGNS	SEE DET	23/A8.80 53/A8.20
31	BOBRICK B–532	COUNTERTOP MOUNTED CIRCULAR WASTE CHUTE	SEE DET	* *
32	SEE DETAILS	ROOM SIGN	SEE DET	26/A8.80 53/A8.20
34	SEE DETAILS	WALL MOUNTED CAMPUS DIRECTORY	SEE DET	43/A8.80 53/A8.20
36	SEE DETAILS	MAX OCCUPANT SIGN	SEE DET	46/A8.80 53/A8.20
37	SEE DETAILS	BUILDING DIRECTORY	SEE DET	53/A8.80 53/A8.20
38	SEE DETAILS	INTERNATIONAL SYMBOL OF ACCESSIBILITY SIGN AT BUILDING ENTRY (DECAL)	SEE ELEV	52/A8.80 51/A8.80
40	SEE DETAILS	"EXIT ROUTE" SIGN	SEE DET	36/A8.80 53/A8.20
42	SEE DETAILS/PROJECT MANUAL	DEDICATION PLAQUE	SEE DET	33/A8.90 53/A8.20
44	SEE DETAILS	MARBLE TRESHOLD	SEE DET	31E/A8.51 *
46	SEE DETAILS	30 MIN BOOKSTORE PARKING ONLY SIGN –SIMILAR TO 22A/A8–80– PROVIDE VERBIAGE	SEE DET SIM	22/A8.80 *
48	SEE DETAILS	RECESSED ENTRY MAT	SEE DET	41/A8.90 *
49	SEE DETAILS	ACCESSIBLE PARKING SIGN AT PARKING STALLS	SEE DET	22/A8.80 *
50	SEE DETAILS	DISABLED ENTRY NOTIFICATION SIGN – TOW AWAY SIGN	SEE DET	22B/A8.80 *
51	SEE PROJECT MANUAL	BATTERY OPERATED CLOCK (WT–3126B)	SEE INT ELEV	53/A8.20 *
54	SEE PROJECT MANUAL	VIDEO PROJECTOR MOUNTING SYSTEM	SEE DET	13/A8.91 *
55	SEE DETAILS / PROJECT MANUAL	VISUAL DISPLAY BOARD – SIZE AS NOTED ON INT. – SEE INTERIORS FOR SEAMS	+7'–0" TOP	21/A8.90 53/A8.20
56	SEE PROJECT MANUAL	RECESSED MOTORIZED PROJECTION SCREEN (72.5"X116")	SEE DET	43/A8.90 53/A8.20
60	"ACROVYN" SCR64	8" WALL GUARD – END CAPS AT ALL TERMINATIONS. FACTORY BENDS AT ALL CHANGES IN DIRECTION	+2'–6" CL	35/A8.90 53/A8.20
61	SEE PROJECT MANUAL	FIRE EXTINGUISHER IN RECESSED CABINET (4–A:60–B:C/10#)	SEE DET	52/A8.90 54/A8.20
62	SEE PROJECT MANUAL	MANUAL OPERATION FOLDING PARTITIONS	SEE DET	22/A8.91 *
63	SEE PROJECT MANUAL	VERTICAL BLINDS	SEE DET	14/A8.90 53/A8.20
66	"ACROVYN" SM20	CORNER GUARD	SEE DET	45/A8.90 *
73	SEE PROJECT MANUAL	DOOR CART BUMPER RAIL	SEE DET	24/A8.90 *
78	SEE PROJECT MANUAL	10# FIRE EXTINGUISER SURFACE MTD W/ SURFACE MOUNT BRACKET "4–A:60–B:C"	SEE DET	54/A8.90 53/A8.20
79	SEE PROJECT MANUAL	2" GROMMET – ROUND TYPE	NA	* *
85	SEE PROJECT MANUAL	MAIL BOXES	SEE DET	22/A8.90 *
87	SEE DETAILS	PROJECT SIGN	SEE DET	42/A8.80 *
89	SEE DETAILS	"EMERGENCY EXIT ONLY– ALARM WILL SOUND" SIGN	SEE DET	44/A8.80 53/A8.20
90	SEE DETAILS	STAINLESS STEEL CORNER GUARD	SEE DET	44/A8.90 *
91	SEE DETAILS	"EXIT" SIGN	SEE DET	35/A8.80 53/A8.20
94	SEE PROJECT MANUAL	11# FIRE EXTINGUISHER SURFACE MOUNTED (HALOTRON) W/ SURFACE MOUNT BRACKET (1–A:10 –B:C)	SEE DET	54/A8.90 53/A8.20
97	SEE PROJECT MANUAL	MOTORIZED SHADES AT HIGH ROOF	SEE DET	11/A8.25 *
98	SEE PROJECT MANUAL	TYPE K FIRE EXTINGUISHER IN RECESSED CABINET	SEE DET	52/A8.90 54/A8.20
100	SEE DETAILS	FIRE DEPARTMENT CONNECTION SIGN	SEE DET	33/A8.80 *
101	SEE DETAILS	PATH OF TRAVEL DIRECTIONAL SIGN	SEE–DET	25/A8.80 *
102	SEE DETAILS / PROJECT MANUAL	TV BRACKET – WALL MOUNT	SEE DET	31/A8.90 *
103	FOIC	FLAT SCREEN TV ±70"	SEE DET	31/A8.90 *

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IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACTIVE: FLOSS
DATE SEP 16 2015

PROJECT INFO

Project No	430–0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

FINISH/JOINT SEALANT/ ACCESSORY SCHEDULES

A2.00

GATE SCHEDULE

TYPICAL DETAILS

A8.12 GATE LEVER	A8.12 GATE PANIC HARDWARE	A8.12 TS FENCE	A8.12 TS GATE W/ PANIC HARDWARE

No	Size (Nom)	Type	Dtl	Location	Hardware No.	Panic Hardware	Remarks
G001	PAIR 6'-0"x6'-6"	SEE DET	43 A8.12	UTILITY YARD AT WCAT DORMS	–	–	
G002	4'-0"x6'-6"	SEE DET	25 A8.12	EXIT GATE AT WCAT DORMS	–	YES	
G003	4'-0"x6'-6"	SEE DET	23 A8.12	EXIT GATE AT WCAT DORMS	–	YES	
G004	4'-0"x6'-6"	SEE DET	23 A8.12	EXIT GATE AT WCAT DORMS	–	YES	
G005	4'-0"x6'-6"	SEE DET	25 A8.12	EXIT GATE AT WCAT DORMS	–	YES	
G006	PAIR 6'-0"x6'-6"	SEE DET	43 A8.12	STORAGE YARD AT WCAT DORMS	–	–	
G007	PAIR 6'-0"x6'-6"	SEE DET	45 A8.12	EX MECH YARD AT WEST ALLEY	–	–	

ACCESS DOOR SCHEDULE

NOTE: ACCESS DOORS FOR VALVES, HVAC DAMPERS AND SIM MECHANICAL ITEMS SHALL BE LOCATED FOR ACCESS. INDICATE LOCATIONS ON COORDINATION DRAWINGS AND RECORD DRAWINGS– AT MIN SIZE

No	Size	Mtl	Frame	Fr	Dtl	Dtl	Remark
A1	24"x36"	MET	MET	NONE	51 A8.50	–	14 GAGE STEEL FRAME AND DOOR PANEL – PAINT TO MATCH CEILING SOFFIT – CYLINDER LOCKS – THICKNESS TO MATCH EIFS
A2	24"x36"	MET	MET	NONE	51 A8.50	–	14 GAGE STEEL FRAME AND DOOR PANEL – PAINT TO MATCH CEILING SOFFIT – CYLINDER LOCKS – THICKNESS TO MATCH GYP BD
A3	16"x16"	MET	MET	NONE	51 A8.50	–	14 GAGE STEEL FRAME AND DOOR PANEL – PAINT TO MATCH CEILING VERIFY WITH MECH. ELEC. FIRE PROTECTION DRAWINGS/SPECIFICATIONS FOR REQUIRED ACCESS DOOR FOR EQUIP. VALVES, MAINTENANCE ITEMS AND ETC – FIRE RATED IN RATED WALLS, SS IN RESTROOMS

REDUCER STRIP SCHEDULE

No	Type	Mfr	Model #	Size	Remarks	Profile
RA1	REDUCER STRIP	MERCER	633	1" x 1/8"	TILE REDUCER 1/8" TO 0"	
RA2	REDUCER STRIP	MERCER	705	2.5/8" x 5/16"	GLUE DOWN CARPET – 5/16" TO 0"	
RA3	REDUCER STRIP	MERCER	710	2.3/8" x 5/16"	GLUE DOWN CARPET TO 1/8" TILE – 5/16" TO 1/8" TRIM REDUCER STRIP TO BUTT TO TILE	
RA4	REDUCER STRIP	MERCER	930	1.1/2" x 1/4"	GLUE DOWN CARPET TO GLUE DOWN CARPET – 1/4" TO 1/4" 970 SINGLE FLANGE TRACK	
RA5	FEATURE STRIP	MERCER	643	1" x 1/8"	FEATURE STRIP – 1/8" TO 1/8"	
RA7	REDUCER STRIP	SCHLUTER	RENO–AEU	VER W/ PAVER THICKNESS	GLUE DOWN CARPET TO PAVER TILE	

DOOR SCHEDULE

TYPICAL DETAILS

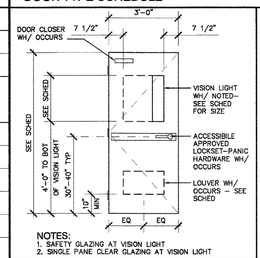
12 A8.70 TYPICAL HM INTERIOR DOOR JAMB OFFSET	13 A8.70 TYPICAL HM FRAME ANCHORAGE	14 A8.70 TYPICAL DOOR JAMB GROUT
11 A8.70 TYPICAL HM EXTERIOR DOOR JAMB OFFSET	21 A8.70 TYPICAL SF CONNECTIONS AT METAL FRAMING	– –

NO	Door SIZE	TH	MTL	TYPE	FRAME	FIRE RATING	Details HEAD	JAMB	SILL	RA	HDWR NO	PANIC HDWR	SIGNS	ACCESS CONTROL	CARD READER	Remarks
500	PAIR 3'-0"x8'-0"	1 3/4"	CW ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	01	Y	38 91	Y	Y	25 A8.72 SEMI-AUTOMATIC DOOR OPERATOR – SEE PROJECT MANUAL
501	PAIR 3'-0"x8'-0"	1 3/4"	CW ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	02	Y	* *	Y	*	45 A8.72 ACCESS CONTROL DIAGRAM
502	PAIR 3'-0"x8'-0"	1 3/4"	CW ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	01	Y	38 91	Y	Y	25 A8.72 SEMI-AUTOMATIC DOOR OPERATOR – SEE PROJECT MANUAL
507	PAIR 3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	01	Y	* 91	Y	Y	25 A8.72 SEMI-AUTOMATIC DOOR OPERATOR – SEE PROJECT MANUAL
511	PAIR 3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	02	Y	* 91	Y	Y	45 A8.72 ACCESS CONTROL DIAGRAM
518	PAIR 3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	03	Y	* 91	Y	Y	45 A8.72 ACCESS CONTROL DIAGRAM
512	PAIR 3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	23 A8.71	23 A8.71	23 A8.71	–	03	Y	* 91	Y	Y	45 A8.72 ACCESS CONTROL DIAGRAM
513	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	04	*	26 *	*	*	6"x24" VISION LITE
515	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	05	*	* 32	*	*	
517	8'– 0"	VER	MET	E	MET	*	46 A8.70	46 A8.70	46 A8.70	–	06	*	* *	*	*	ROLL–UP COUNTER DOOR
519	11'– 0"	VER	MET	H	MET	*	26 A8.70	26 A8.70	26 A8.70	–	06	*	* *	*	*	ROLL–UP DOOR
502	PAIR 3'-0"x8'-0"	1 3/4"	WD	A	HM	*	A12 A8.70	A 51 A8.70	A12 A8.70	–	07	*	40 *	Y	Y	50 A8.72 ACCESS CONTROL DIAGRAM
503	SWINGING 3'-0"x7'-0"	1 3/4"	WD	D	HM	*	56 A8.70	56 A8.70	56 A8.70	–	##	*	32 40	*	*	
503	3'-0"x8'-0"	1 3/4"	HM	B	HM	*	32 A8.70	32 A8.70	32 A8.70	–	08	Y	32 91	Y	Y	25 A8.73 ACCESS CONTROL DIAGRAM
503	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	09	*	* 26	*	*	HALF–LITE
503	5'-6"x 7'-0"	VER	*	G	SS	*	12 A8.70	12 A8.70	– –	–	##	*	* *	*	*	FRAME ONLY, STAINLESS STEEL – INSTALL SIM TO HM FRAME
503	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	10	*	* 32	*	*	
503	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	09	*	* 32	*	*	6" x 24" VISION LITE
503	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	11	*	28 *	*	*	
503	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	12	*	* 32	*	*	6"x24" VISION LITE
504	3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	25 A8.71	25 A8.71	25 A8.71	–	13	*	* 26	Y	Y	45 A8.73 ACCESS CONTROL DIAGRAM
504	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	14	*	26 32	Y	Y	45 A8.73 ACCESS CONTROL DIAGRAM, 6"X24" VISION LITE
505	3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	25 A8.71	25 A8.71	25 A8.71	–	15	*	* 26	*	*	
506	3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	25 A8.71	25 A8.71	25 A8.71	–	16	*	91 26	*	*	
506	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	09	*	25 32	*	*	
506	4'-0"x8'-0"	1 3/4"	HM	B	HM	*	32 A8.70	32 A8.70	32 A8.70	–	17	*	* 32	Y	Y	40 A8.73 ACCESS CONTROL DIAGRAM
507	3'-0"x8'-0"	1 3/4"	HM	B	HM	*	32 A8.70	32 A8.70	32 A8.70	–	18	*	* 32	*	*	
510	PAIR 3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	45 A8.71	45 A8.71	45 A8.71	–	19	Y	32 91	Y	Y	45 A8.72 ACCESS CONTROL DIAGRAM
509	PAIR 4'-0"x8'-0"	1 3/4"	HM	B	HM	*	32 A8.70	32 A8.70	32 A8.70	–	21	*	24 32	Y	Y	55 A8.72 ACCESS CONTROL DIAGRAM
510	3'-0"x8'-0"	1 3/4"	SF ALUM	C	ALUM	*	24 A8.71	24 A8.71	24 A8.71	–	22	Y	32 89	Y	Y	
511	3'-0"x7'-0"	1 3/4"	SF ALUM	C	ALUM	*	45 A8.71	45 A8.71	45 A8.71	–	15	*	32 *	*	*	25 A8.73 ACCESS CONTROL DIAGRAM
512	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	09	*	* 26	*	*	
515	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	23	*	* 32	*	*	6"x 24" VISION LITE
516	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	24	*	* 28	*	*	
516A	1'-2"x6'-0"	1 3/4"	HM	F	HM	*	51 A8.70	12 A8.70	51 A8.70	–	25	*	* 28	*	*	
517	3'-0"x7'-0"	1 3/4"	WD	A	HM	*	51 A8.70	12 A8.70	51 A8.70	–	24	*	* 28	*	*	
520	3'-0"x8'-0"	1 3/4"	HM	B	HM	*	31 A8.70	31 A8.70	31 A8.70	–	26	*	* 32	Y	Y	
521	3'-0"x8'-0"	1 3/4"	HM	B	HM	*	31 A8.70	31 A8.70	31 A8.70	–	27	*	* 32	Y	Y	45 A8.73 ACCESS CONTROL DIAGRAM, 6"X24" VISION LITE
522	3'-0"x8'-0"	1 3/4"	HM	B	HM	*	31 A8.70	31 A8.70	31 A8.70	–	18	*	* 32	*	*	45 A8.73 ACCESS CONTROL DIAGRAM
522	PAIR 3'-0"x8'-0"	1 3/4"	HM	B	HM	*	31 A8.70	31 A8.70	31 A8.70	–	28	*	* 32	*	*	LOUVER, SEE PLANS
FP4	SPECIAL SEE PLANS	VER	VER	SPECIAL	VER						14					FOLDING PARTITION DOOR, SEE SPECS

GENERAL DOOR TYPICAL NOTES

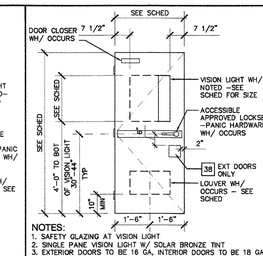
1. EXIT DOORS SHALL BE OPEMABLE FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT
2. RATED DOORS TO BE POSITIVE LATCHING WITH SMOKE AND DRAFT STOP ASSEMBLIES.
3. MANUFACTURERS INSTALLATION INSTRUCTIONS SHALL BE AVAILABLE ON THE JOB SITE FOR ALL RATED DOOR ASSEMBLIES AND RELATED HARDWARE.
4. MAXIMUM EFFORT TO OPERATE FIRE DOORS SHALL NOT EXCEED 15 LBS WHEN APPROVED BY ADMINISTRATIVE AUTHORITY.
5. MAXIMUM EFFORT TO OPERATE NON–RATED DOORS SHALL NOT EXCEED 5 LBS FOR EXTERIOR AND 5 LBS FOR INTERIOR DOORS.
6. DOOR SIZES INDICATED ARE NOMINAL DIMENSIONS. REFER TO HARDWARE SPECIFICATIONS FOR COORDINATION OF HARDWARE INDICATED.
7. GLASS IN RATED ASSEMBLIES SHALL BE LABELED FOR SUCH.
8. MOUNTING HTS OF ACCESSIBLE APPROVED LOCKSETS, PANIC DEVICES AND OTHER DOOR OPERATION HARDWARE SHALL BE APPROVED BY ARCHITECT PRIOR TO INSTALLATION.

DOOR TYPE SCHEDULE



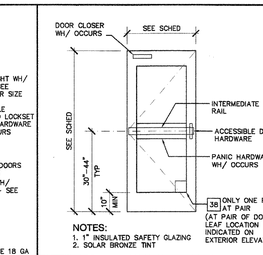
NOTES:
1. SAFETY GLAZING AT VISION LIGHT
2. SINGLE PANE CLEAR GLAZING AT VISION LIGHT

(A) SOLID CORE WOOD DOOR



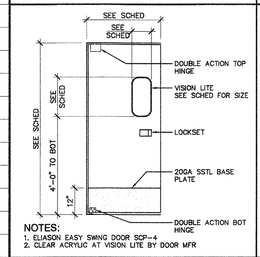
NOTES:
1. SAFETY GLAZING AT VISION LIGHT
2. SINGLE PANE VISION LIGHT W/ SOLAR BRONZE TINT
3. EXTERIOR DOORS TO BE 18 GA, INTERIOR DOORS TO BE 18 GA

(B) HOLLOW METAL DOOR



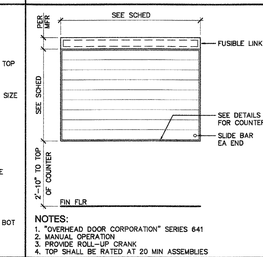
NOTES:
1. 1" INSULATED SAFETY GLAZING
2. SOLAR BRONZE TINT

(C) ALUMINUM STOREFRONT DOOR



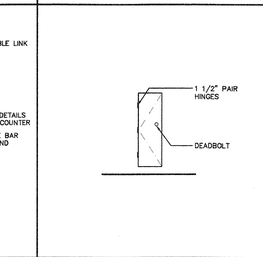
NOTES:
1. ELIASON EASY SWING DOOR SCP–4
2. CLEAR ACRYLIC AT VISION LITE BY DOOR MFR

(D) DOUBLE–ACTING SOLID CORE WD DOOR

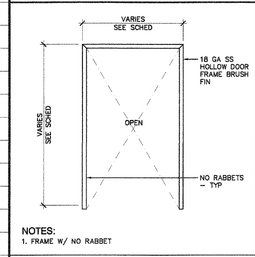


NOTES:
1. "OVERHEAD DOOR CORPORATION" SERIES 641
2. MANUAL OPERATION
3. PROVIDE ROLL–UP CRANK
4. TOP SHALL BE RATED AT 20 MIN ASSEMBLIES

(E) ROLL UP COUNTER DOOR

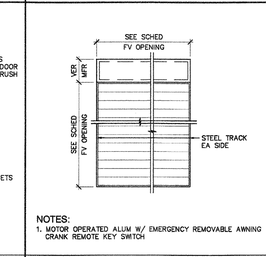


(F) HOLLOW METAL ACCESS DOOR



NOTES:
1. FRAME W/ NO RABBET

(G) SS HOLLOW DOOR FRAME



NOTES:
1. MOTOR OPERATED ALUM W/ EMERGENCY REMOVABLE AWNING CRANK REMOTE KEY SWITCH

(H) ROLL UP DOOR

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FILE NO. 15-C2
APP. NO. 03-115449
ACK FLS SS
DATE SEP 16 2015

PROJECT INFO

Project No	430–0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

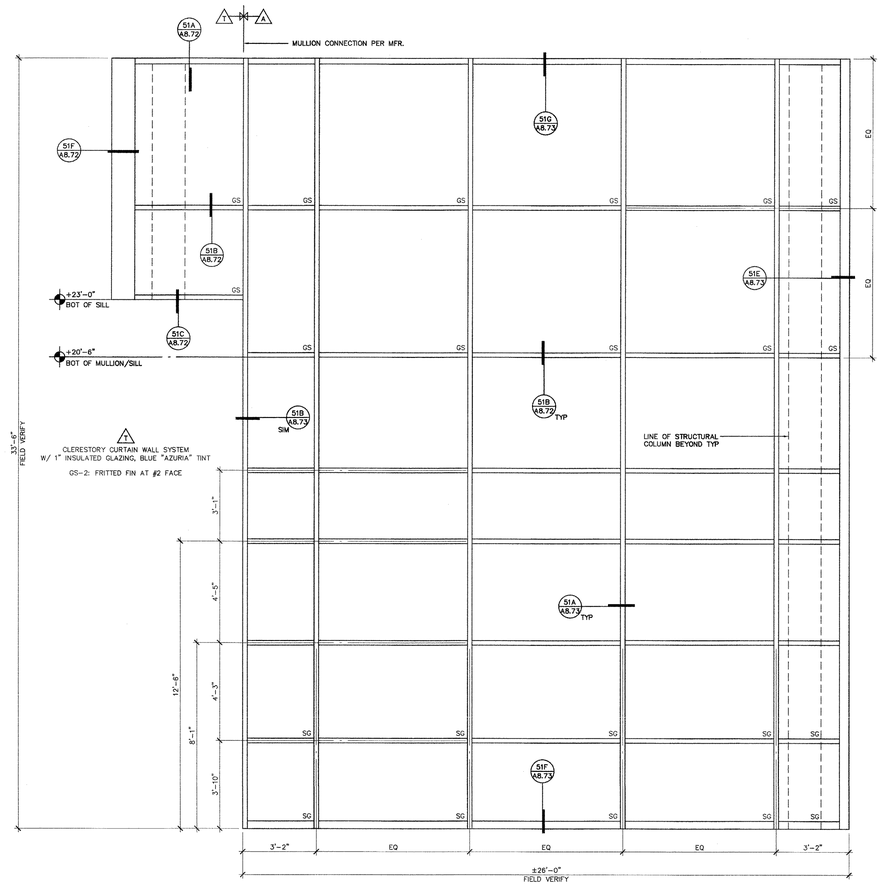
No	Date	Item
1	00.00.00	DESCRIPTION

DOOR/GATE/ACCESS DOOR SCHEDULES

A2.10

WINDOW SCHEDULE

SCALE: 3/8" = 1'-0"



1 CLERESTORY CURTAIN WALL SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT
GS-2: FRITTED FIN AT #2 FACE

A CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING
GS: FRITTED FIN AT #2 FACE
SG: SAFETY GLAZING

DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS

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FOR PLAN REVIEW ONLY

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IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115111
ACC. FLS SS
DATE SEP 16 2015

PROJECT INFO

Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	10.01.2012

REVISIONS

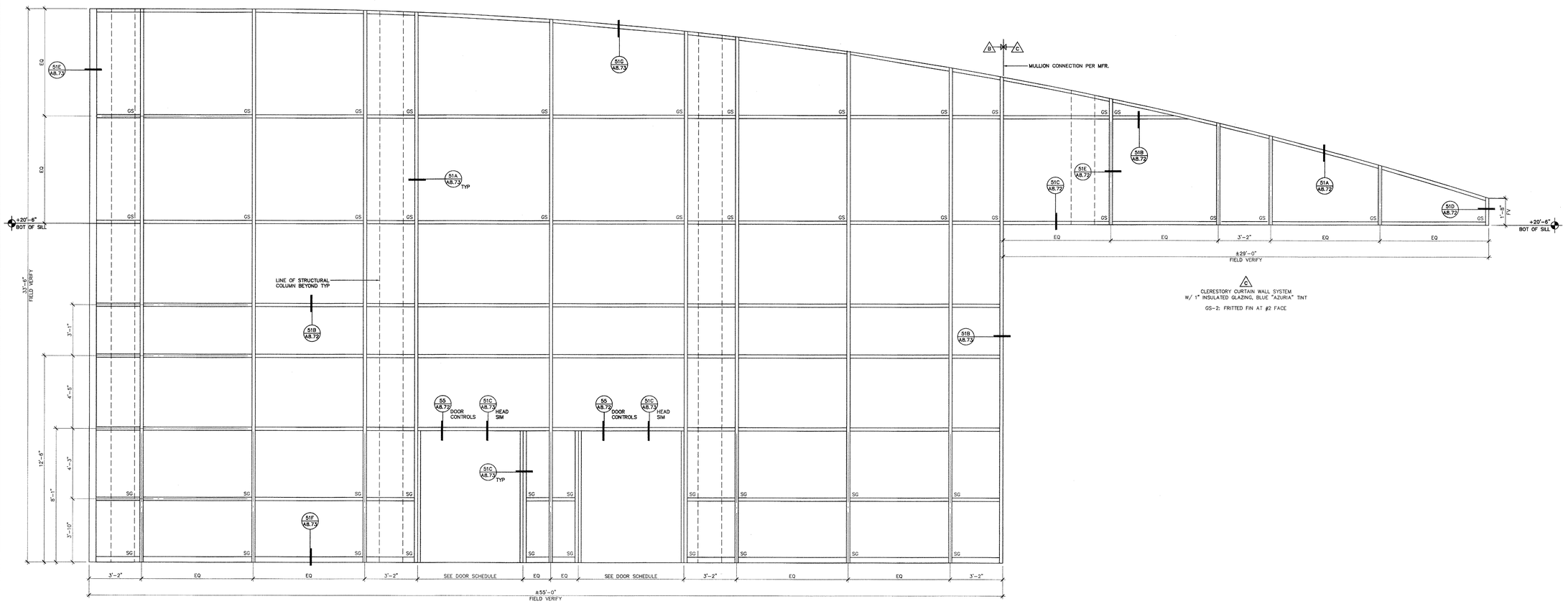
No	Date	Item
1	00.00.00	DESCRIPTION

WINDOW SCHEDULE

A2.11

WINDOW SCHEDULE

SCALE: 3/8" = 1'-0"



△C
CLERESTORY CURTAIN WALL SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT
GS-2: FRITTED FIN AT #2 FACE

△B
CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING
GS: FRITTED FIN AT #2 FACE
SG: SAFETY GLAZING
DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS

△D
CLERESTORY CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING
GS: FRITTED FIN AT #2 FACE
DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS

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KEVIN COBB, AIA
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DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115411
ACTION FLS SS
DATE SEP 16 2015

PROJECT INFO

Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	10.01.2012

REVISIONS

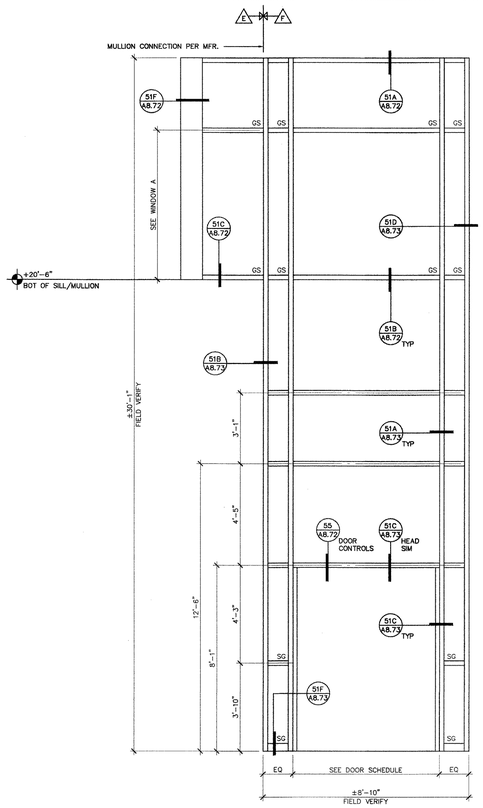
No	Date	Item
1	00.00.00	DESCRIPTION

WINDOW SCHEDULE

A2.12

WINDOW SCHEDULE

SCALE: 3/8" = 1'-0"



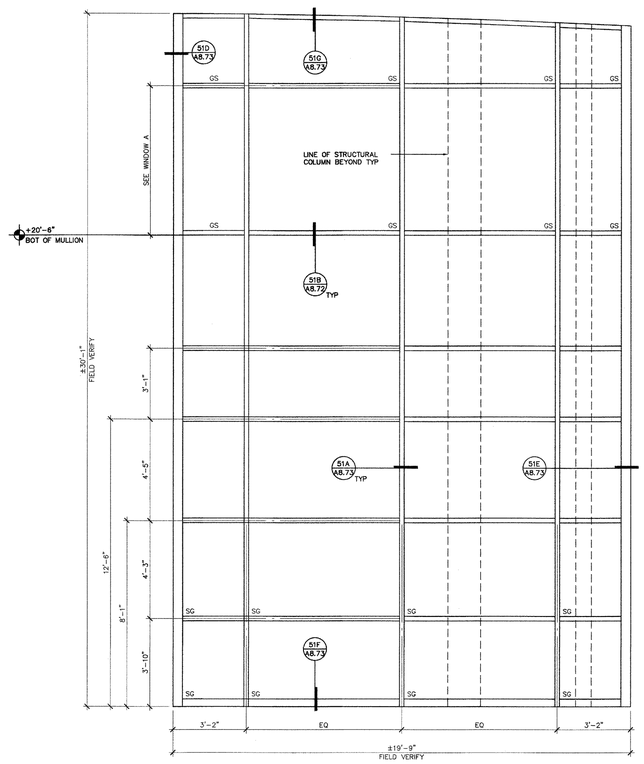
E
CLERESTORY CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE

F
CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE
SG: SAFETY GLAZING

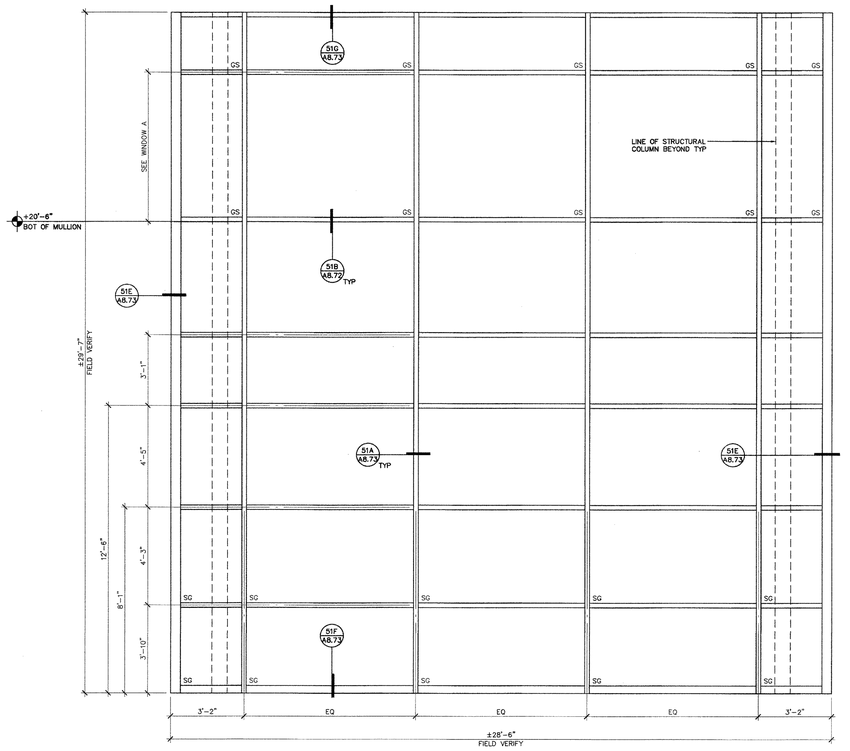
DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS



G
CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE
SG: SAFETY GLAZING

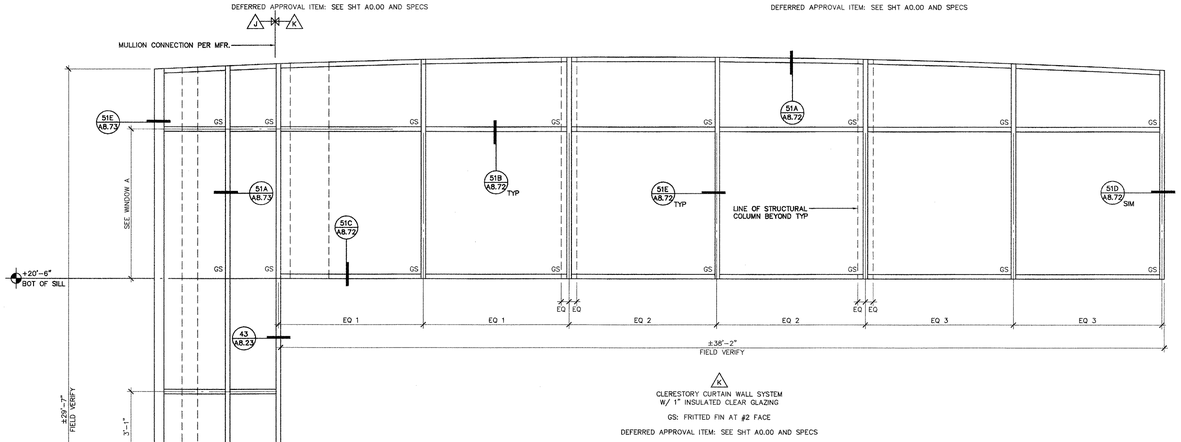
DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS



H
CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE
SG: SAFETY GLAZING

DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS



A
CLERESTORY CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE

DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS

J
CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE
SG: SAFETY GLAZING

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APP. NO. 03-117419
AC FLS SS as
DATE SEP 16 2015

PROJECT INFO

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Drawn By	MS/SA
Checked By	JV
Date	10.01.2012

REVISIONS

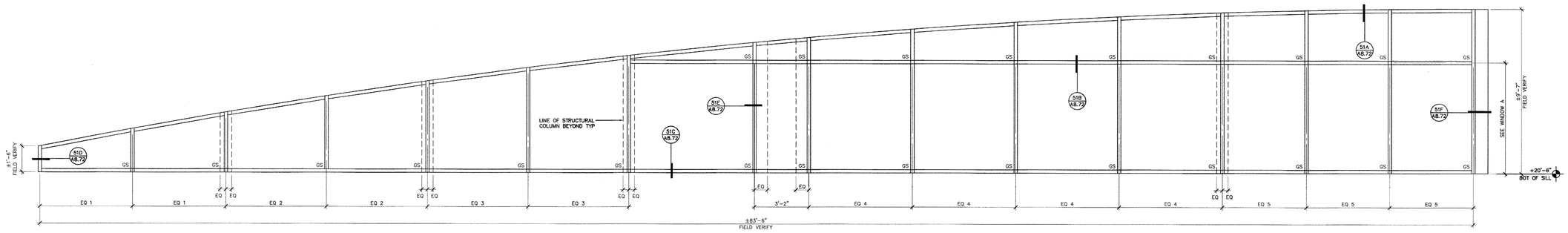
No	Date	Item
A	00.00.00	DESCRIPTION

WINDOW SCHEDULE

A2.13

WINDOW SCHEDULE

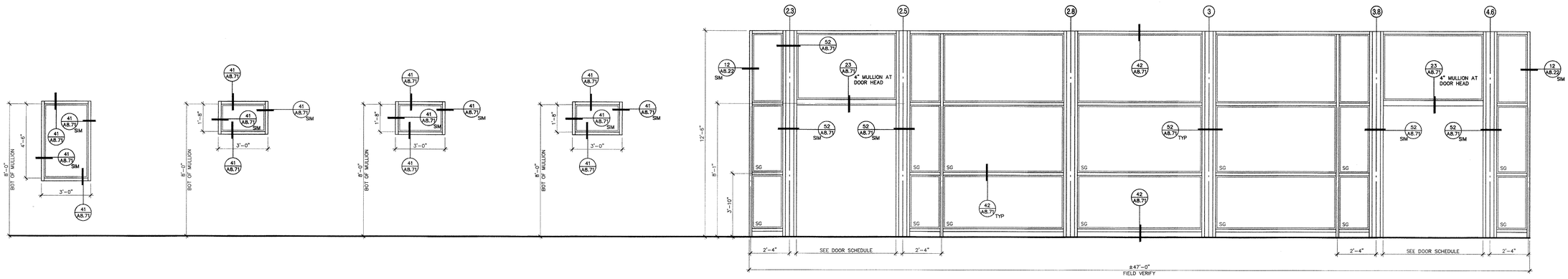
SCALE: 3/8" = 1'-0"



L
CLERESTORY CURTAIN WALL SYSTEM
W/ 1" INSULATED CLEAR GLAZING

GS: FRITTED FIN AT #2 FACE

DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS



M
6" x 2" ALUMINUM STOREFRONT SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT

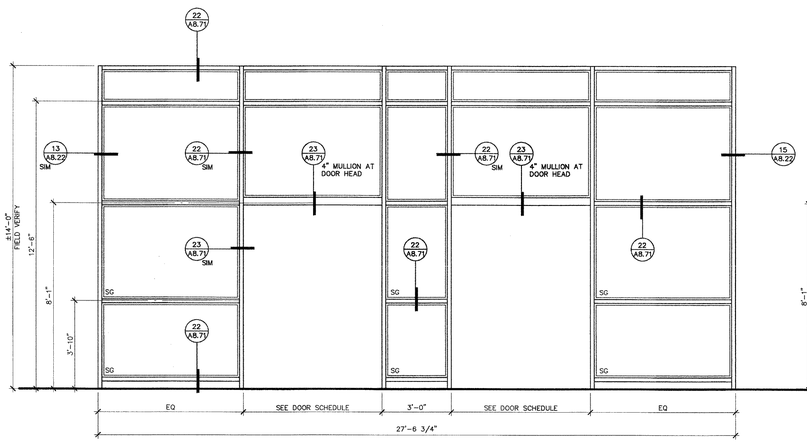
H
6" x 2" ALUMINUM STOREFRONT SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT

P
6" x 2" ALUMINUM STOREFRONT SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT

Q
6" x 2" ALUMINUM STOREFRONT SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT

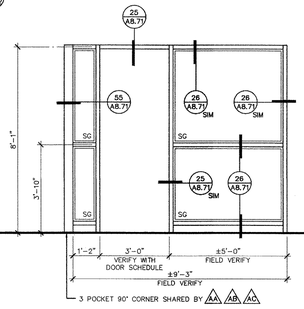
R
6" x 2" ALUMINUM STOREFRONT SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT

DEFERRED APPROVAL: SEE SHT A0.00 AND SPECS

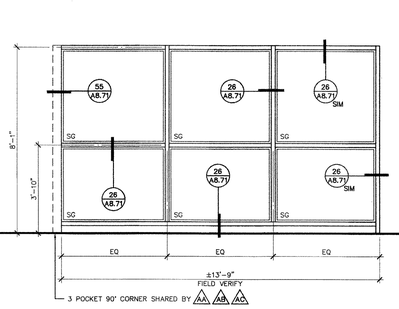


A
6" x 2" ALUMINUM STOREFRONT SYSTEM
W/ 1" INSULATED GLAZING, BLUE "AZURIA" TINT

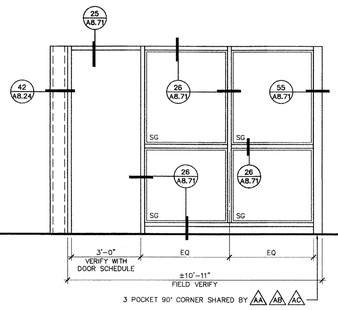
DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS



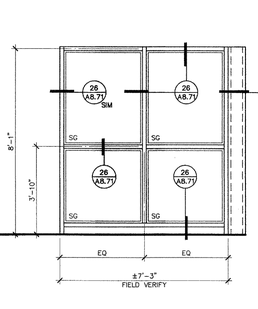
AA
4 1/2"x2" ALUMINUM STOREFRONT SYSTEM
W/ 1/4" INSULATED CLEAR GLAZING



AB
4 1/2"x2" ALUMINUM STOREFRONT SYSTEM
W/ 1/4" INSULATED CLEAR GLAZING



AC
4 1/2"x2" ALUMINUM STOREFRONT SYSTEM
W/ 1/4" INSULATED CLEAR GLAZING



AD
4 1/2"x2" ALUMINUM STOREFRONT SYSTEM
W/ 1/4" INSULATED CLEAR GLAZING

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FILE NO. 15-C2
APP. NO. 03-115419
AC FL SS
DATE SEP 16 2015

PROJECT INFO

Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	10.01.2012

REVISIONS

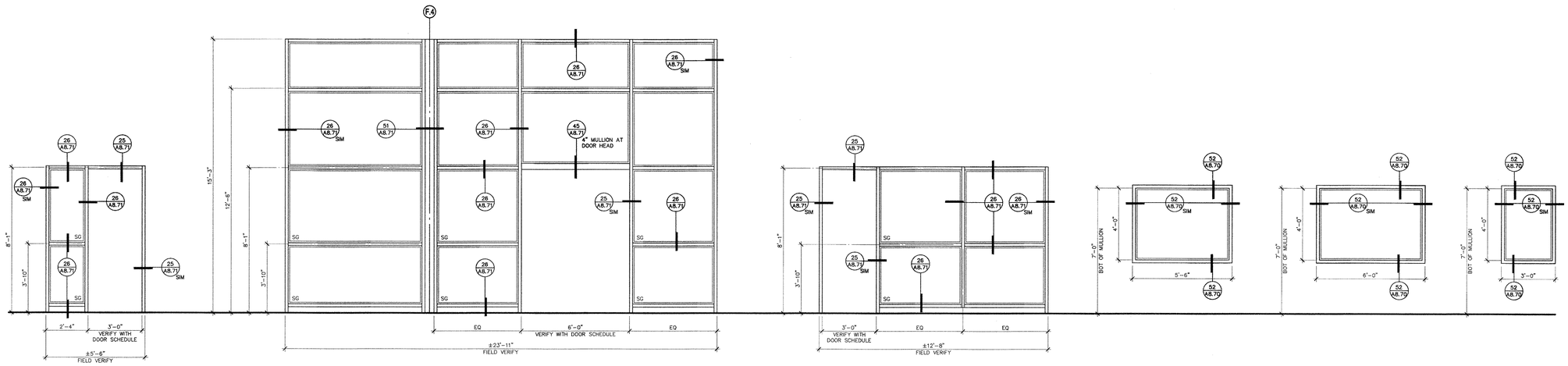
No	Date	Item
1	00.00.00	DESCRIPTION

WINDOW SCHEDULE

A2.14

WINDOW SCHEDULE

SCALE: 3/8" = 1'-0"



A6 4 1/2"x2" ALUMINUM STOREFRONT SYSTEM W/ 1/4" INSULATED CLEAR GLAZING

A7 4 1/2"x2" ALUMINUM STOREFRONT SYSTEM W/ 1/4" INSULATED CLEAR GLAZING

DEFERRED APPROVAL ITEM: SEE SHT A0.00 AND SPECS

A10 4 1/2"x2" ALUMINUM STOREFRONT SYSTEM W/ 1/4" INSULATED CLEAR GLAZING

AH HM FRAME FIXED WINDOW W/ 1/4" CLEAR GLAZING

AJ HM FRAME FIXED WINDOW W/ 1/4" CLEAR GLAZING

AK HM FRAME FIXED WINDOW W/ 1/4" CLEAR GLAZING

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APP. NO. 03-115119
ACK. FLS SS
DATE SEP 16 2015

PROJECT INFO

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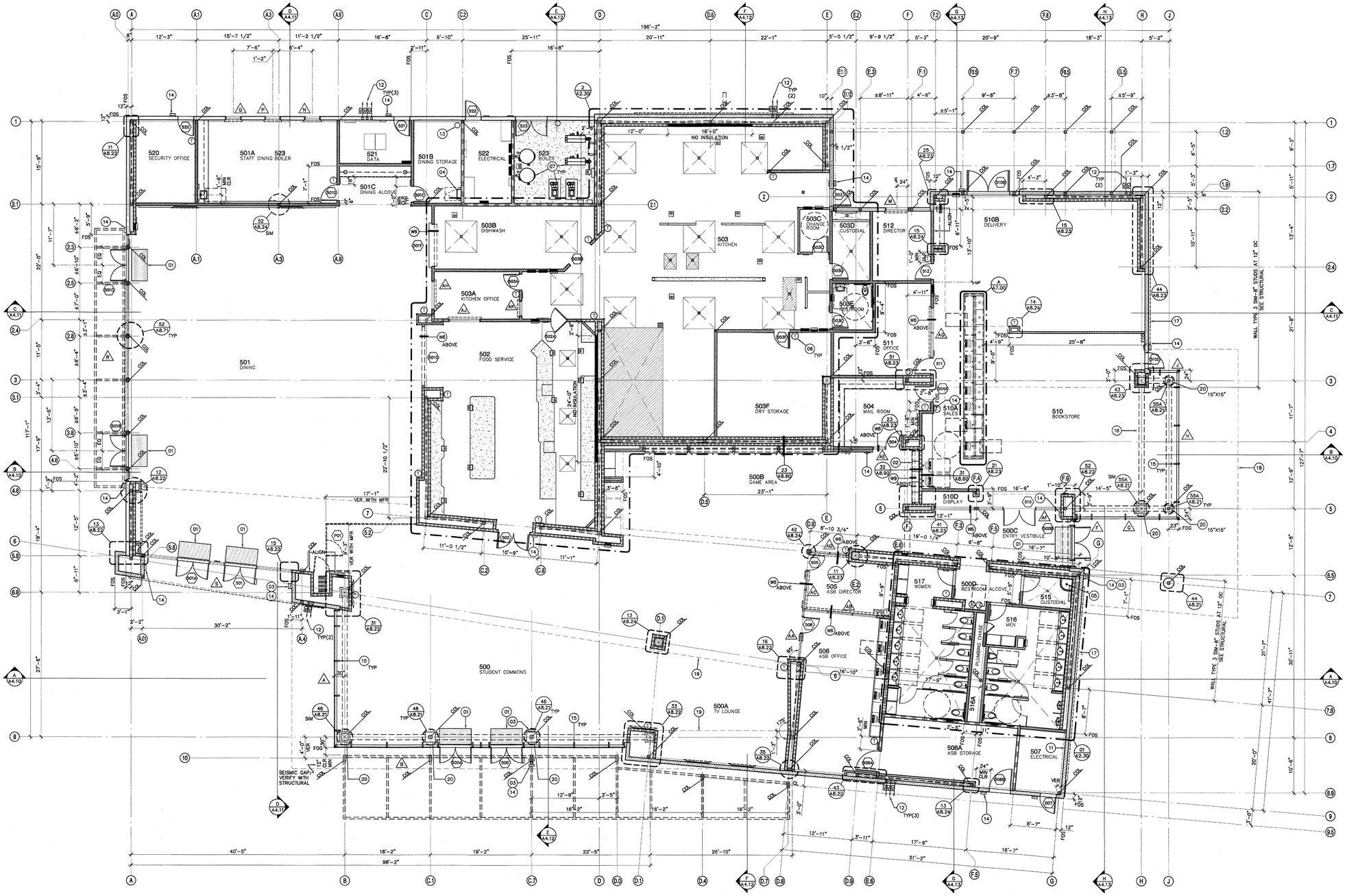
Drawn By	MS/SA
Checked By	JV
Date	10.01.2012

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

WINDOW SCHEDULE

A2.15



Dimensioned Floor Plan

1/8" = 1'-0"

TYPICAL FLOOR PLAN DETAILS

24 / A8.00	NON-ACCESSIBLE TOILET STALL
30 / A8.00	ACCESSIBLE LAVATORY
34 / A8.00	ACCESSIBLE COUNTER LAVATORY
36 / A8.00	ACCESSIBLE SINK AT CABINET
54 / A8.00	ACCESSIBLE DRINKING FOUNTAIN
25 / A8.00	ACCESSIBLE MULTIPLE ACCOMMODATION TOILET STALL
14 / A8.00	ACCESSIBLE URINAL
26 / A8.00	ACCESSIBLE SINGLE ACCOMMODATION STALL

WALL TYPE LEGEND

NOTE: WHERE RATED PARTITIONS ARE INTERSECTED BY NON-RATED PARTITIONS, CARRY RATING THRU NON-RATED PARTITION

LINE STYLE	DESCRIPTION	
W1	EXTERIOR WALL – 8" METAL STUDS W/ EIFS FINISH, NON-RATED	21 / A8.20
W2	INTERIOR WALL – 6" METAL STUDS, FULL HT	22 / A8.20
W3	EXTERIOR WALL – 8" METAL STUDS W/ STONE VENEER FINISH NON-RATED, OMIT GYP BD AT INTERIOR OF WALL CAVITY	23 / A8.20
W4	EXTERIOR WALL – 6" METAL STUDS W/ ALUMINUM CLADDING FINISH NON-RATED	24 / A8.20
W5	6" METAL STUD, FULL HT ONE HOUR RATED	25 / A8.20
W6	6" METAL STUD, FULL HT NON-RATED– (2) LAYERS OF GYP BD	26 / A8.20
W7	4" METAL STUD, CEILING HT NON-RATED	41 / A8.20
W8	6" STAGGERED METAL STUD W/ 8" METAL TRACK, FULL HT SOUND BARRIER, NON-RATED	42 / A8.20
W9	6" METAL STUD, FULL HT SINGLE SIDE FINISH (2) LAYERS GYP BD, NON-RATED	43 / A8.20
COL	TYPICAL STEEL COLUMN, SEE STRUCTURAL FOR ADDITIONAL INFO/SIZES	
COL	TYPICAL STEEL COLUMN, SEE STRUCTURAL FOR ADDITIONAL INFO/SIZES	

FLOOR PLAN KEYNOTES

01 RECESSED ENTRY MAT, SEE ACCESSORY SCHEDULE
02 WALL MOUNTED RECESSED MAILBOXES, SEE INTERIOR ELEVATIONS
03 AUTOMATIC DOOR OPENER, SEE DOOR SCHEDULE
04 ROOF HATCH/SCUTTLE/LADDER, VERIFY LOCATION IN FIELD — 45 / A8.30
05 MOP SINK, SEE PLUMBING SHEETS FOR MORE INFORMATION
06 THERMOSTAT LOCATION, SEE MECHANICAL
07 EQUIPMENT AT MECHANICAL ROOM, SEE MECHANICAL PLANS FOR MORE INFORMATION
08 NOT USED
09 NOT USED
10 NOT USED
11 ELECTRICAL/COMMUNICATION/PANELS/EQUIPMENT, SEE ELECTRICAL
12 4" ROOF DRAIN LINES UNDER/THRU FOOTING. SEE STRUCTURAL/SITE UTILITY PLANS FOR CONNECTION TO STORM DRAIN LINE. VERIFY ROUTING DOWN WALL IN FIELD, COORDINATE WITH SITE CONDITIONS.
13 6" ASR, SEE DETAIL. REQUIRED BUTTERFLY VALVE/ CHECK VALVE. SEE ELECTRICAL/FIRE SPRINKLER PLANS FOR MORE INFORMATION — 13 / A8.17
14 CARD READER, SEE DOOR SCHEDULE
15 STEEL MULLION AT CURTAIN WALL, DEFERRED APPROVAL
16 LINE OF STRUCTURAL BEAM ABOVE, SEE REFLECTED CEILING PLAN
17 BUILDING LETTERS, SEE PLANS
18 LINE OF BUILDING ROOF OVERHANG
19 CEILING SOFFIT LINE, SEE PLANS
20 ANODIZED ALUMINUM COLUMN CLADDING SYSTEM, 23"X23" AT COLUMN UNO

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FILE NO. 15-C2
APP. NO. 03-115449
ACK. FLS SS
DATE SEP 16 2015

PROJECT INFO

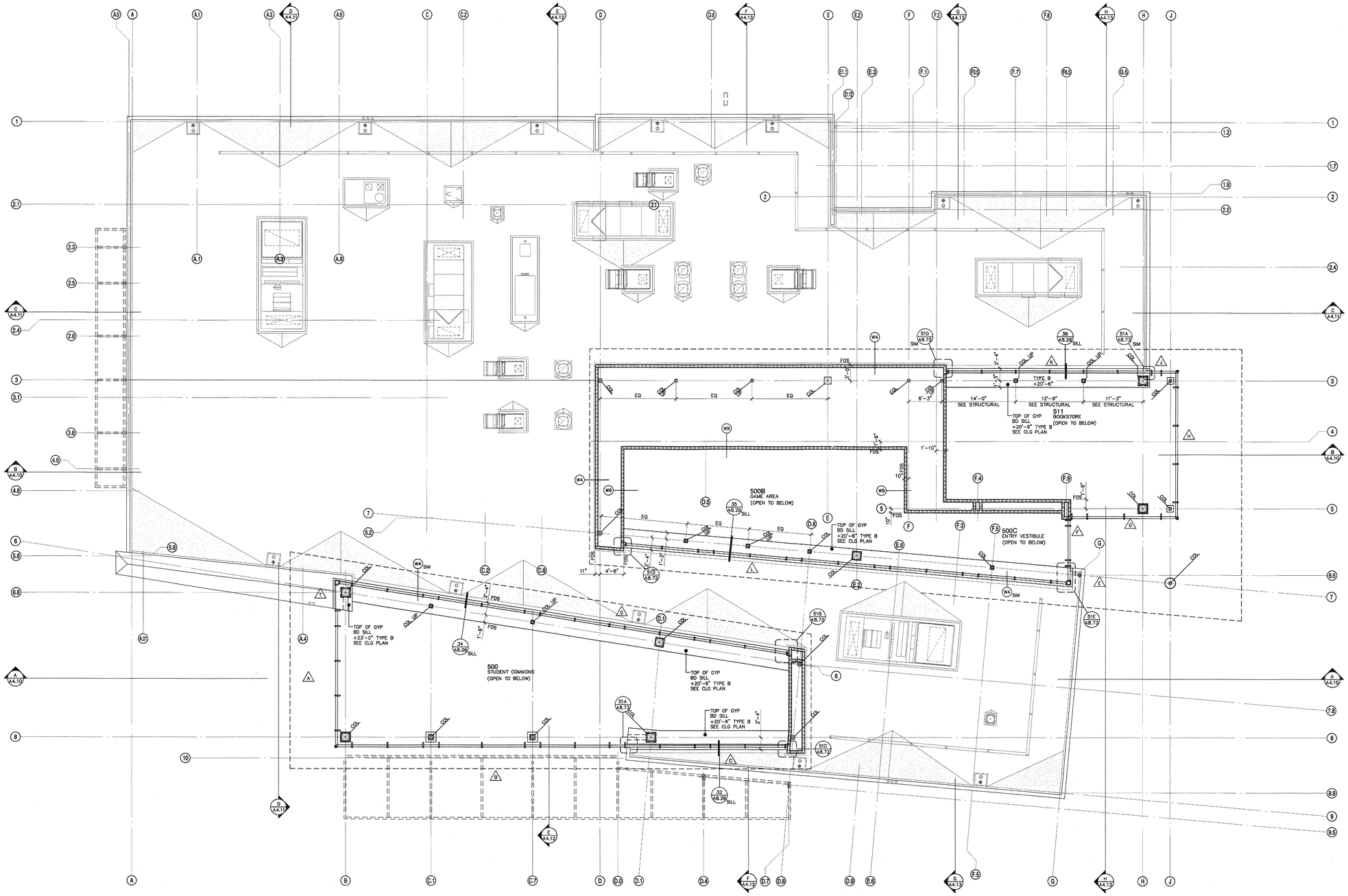
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DIMENSIONED FLOOR PLAN

A2.20



Dimensioned Clerestory Floor Plan

1/8"=1'-0"

NORTH

TYPICAL FLOOR PLAN DETAILS

24 / A8.00	NON-ACCESSIBLE TOILET STALL
30 / A8.00	ACCESSIBLE LAVATORY
34 / A8.00	ACCESSIBLE COUNTER LAVATORY
36 / A8.00	ACCESSIBLE SINK AT CABINET
54 / A8.00	ACCESSIBLE DRINKING FOUNTAIN
25 / A8.00	ACCESSIBLE MULTIPLE ACCOMMODATION TOILET STALL
14 / A8.00	ACCESSIBLE URINAL
26 / A8.00	ACCESSIBLE SINGLE ACCOMMODATION STALL

WALL TYPE LEGEND

NOTE: WHERE RATED PARTITIONS ARE INTERSECTED BY NON-RATED PARTITIONS, CARRY RATING THRU NON-RATED PARTITION

LINE STYLE	DESCRIPTION	
W1	EXTERIOR WALL – 8" METAL STUDS W/ EIFS FINISH, NON-RATED	21 / A8.20
W2	INTERIOR WALL – 6" METAL STUDS, FULL HT	22 / A8.20
W3	EXTERIOR WALL – 8" METAL STUDS W/ STONE VENEER FINISH NON-RATED, OMIT GYP BD AT INTERIOR OF WALL CAVITY	23 / A8.20
W4	EXTERIOR WALL – 6" METAL STUDS W/ ALUMINUM CLADDING FINISH NON-RATED	24 / A8.20
W5	6" METAL STUD, FULL HT ONE HOUR RATED	25 / A8.20
W6	6" METAL STUD, FULL HT NON-RATED– (2) LAYERS OF GYP BD	26 / A8.20
W7	4" METAL STUD, CEILING HT NON-RATED	41 / A8.20
W8	6" STAGGERED METAL STUD W/ 8" METAL TRACK, FULL HT SOUND BARRIER, NON-RATED	42 / A8.20
W9	6" METAL STUD, FULL HT SINGLE SIDE FINISH (2) LAYERS GYP BD, NON-RATED	43 / A8.20
COL	TYPICAL STEEL COLUMN, SEE STRUCTURAL FOR ADDITIONAL INFO/SIZES	
COL	TYPICAL STEEL COLUMN, SEE STRUCTURAL FOR ADDITIONAL INFO/SIZES	

FLOOR PLAN KEYNOTES

01 RECESSED ENTRY MAT, SEE ACCESSORY SCHEDULE
02 WALL MOUNTED RECESSED MAILBOXES, SEE INTERIOR ELEVATIONS
03 AUTOMATIC DOOR OPENER, SEE DOOR SCHEDULE
04 ROOF HATCH/SCUTTLE/LADDER, VERIFY LOCATION IN FIELD — 45 / A8.30
05 MOP SINK, SEE PLUMBING SHEETS FOR MORE INFORMATION
06 THERMOSTAT LOCATION, SEE MECHANICAL
07 EQUIPMENT AT MECHANICAL ROOM, SEE MECHANICAL PLANS FOR MORE INFORMATION
08 NOT USED
09 NOT USED
10 NOT USED
11 ELECTRICAL/COMMUNICATION/PANELS/EQUIPMENT, SEE ELECTRICAL
12 4" ROOF DRAIN LINES UNDER/THRU FOOTING. SEE STRUCTURAL/SITE UTILITY PLANS FOR CONNECTION TO STORM DRAIN LINE. VERIFY ROUTING DOWN WALL IN FIELD, COORDINATE WITH SITE CONDITIONS.
13 6" ASR, SEE DETAIL REQUIRED BUTTERFLY VALVE/ CHECK VALVE. SEE ELECTRICAL/FIRE SPRINKLER PLANS FOR MORE INFORMATION — 43 / A8.11
14 CARD READER, SEE DOOR SCHEDULE
15 STEEL MULLION AT CURTAIN WALL, DEFERRED APPROVAL
16 LINE OF STRUCTURAL BEAM ABOVE, SEE REFLECTED CEILING PLAN
17 BUILDING LETTERS, SEE PLANS
18 LINE OF BUILDING ROOF OVERHANG
19 CEILING SOFFIT LINE, SEE PLANS
20 ANODIZED ALUMINUM COLUMN CLADDING SYSTEM, 23"x23" AT COLUMN UNO

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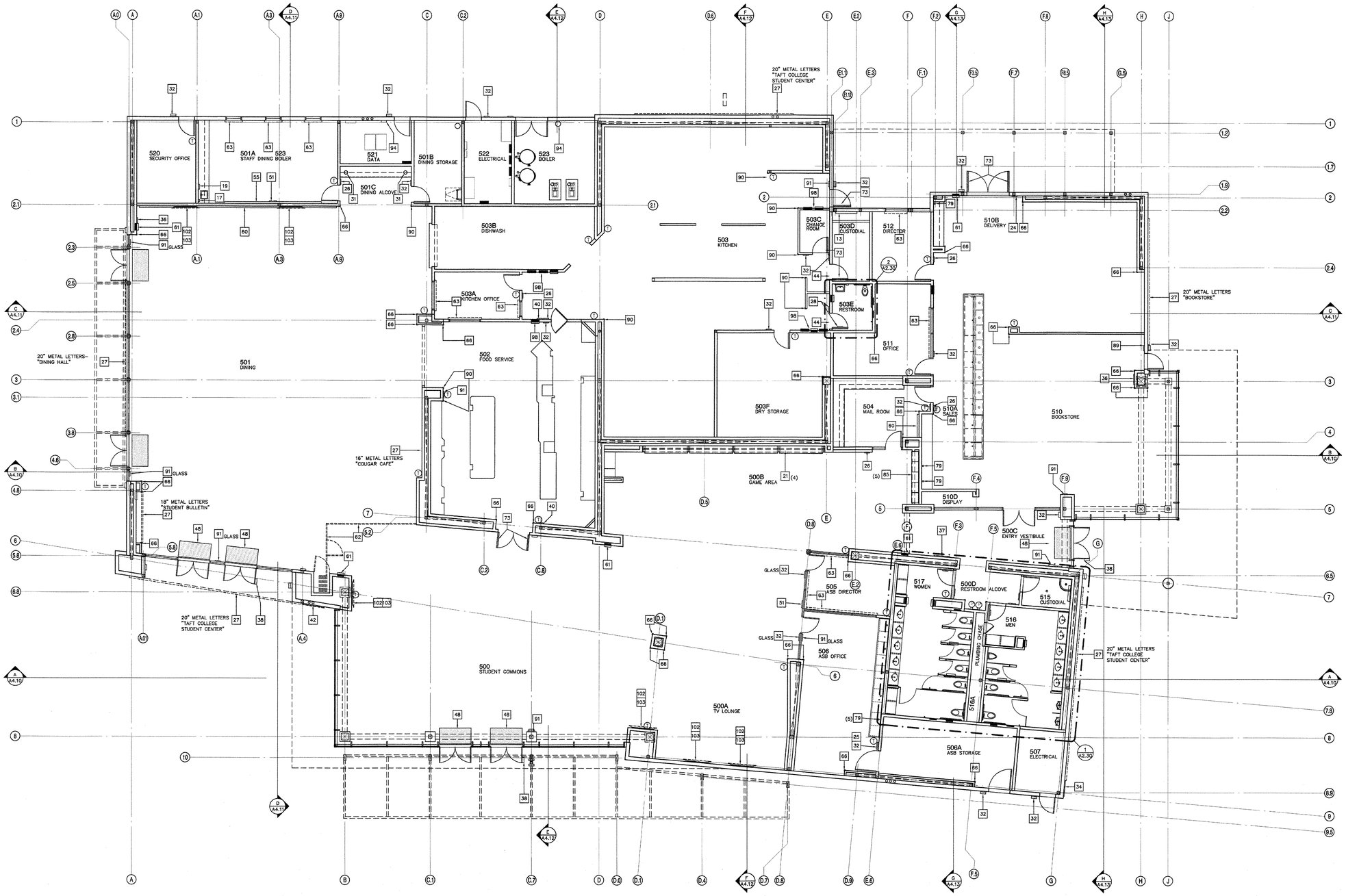
REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DIMENSIONED CLERESTORY FLOOR PLAN

A2.21



Accessory Floor Plan

1/8"=1'-0"

* ACCESSORY SYMBOL, SEE ACCESSORY SCHEDULE ON SHEET A2.00 FOR MORE INFORMATION

NORTH

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ACCESSORY FLOOR PLAN

A2.22

Floor Pattern Plan

1/8"=1'-0"

FINISHED FLOOR LEGEND

- CARPET CT-1/CT-2 -SEE FINISH SCHEDULE FOR TYPE
- UCMT-1/8X8 QUARRY TILE -SEE FINISH SCHEDULE FOR TYPE
- COVED SHEET RUBBER - RT-2
- 36X36 RUBBER TILE - RT-1
- 12x12 VCT/SDVCT -SEE FINISH SCHEDULE FOR TYPE
- PAVER TILE
- EXPOSED CONCRETE

1. FOR RA REFERENCE SEE SHEET A2.00 REDUCER STRIP.

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REVISIONS

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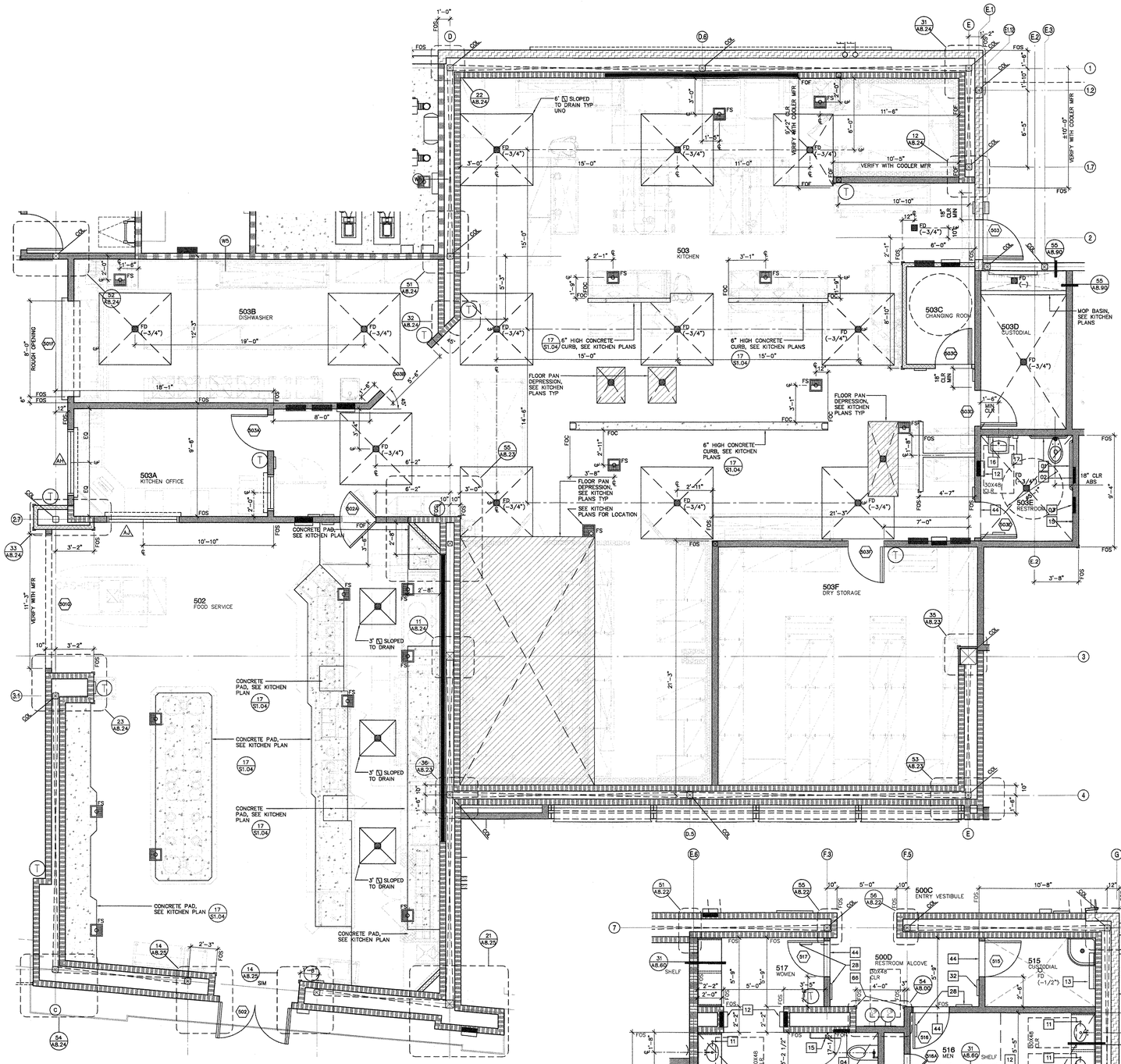
1	00.00.00	DESCRIPTION

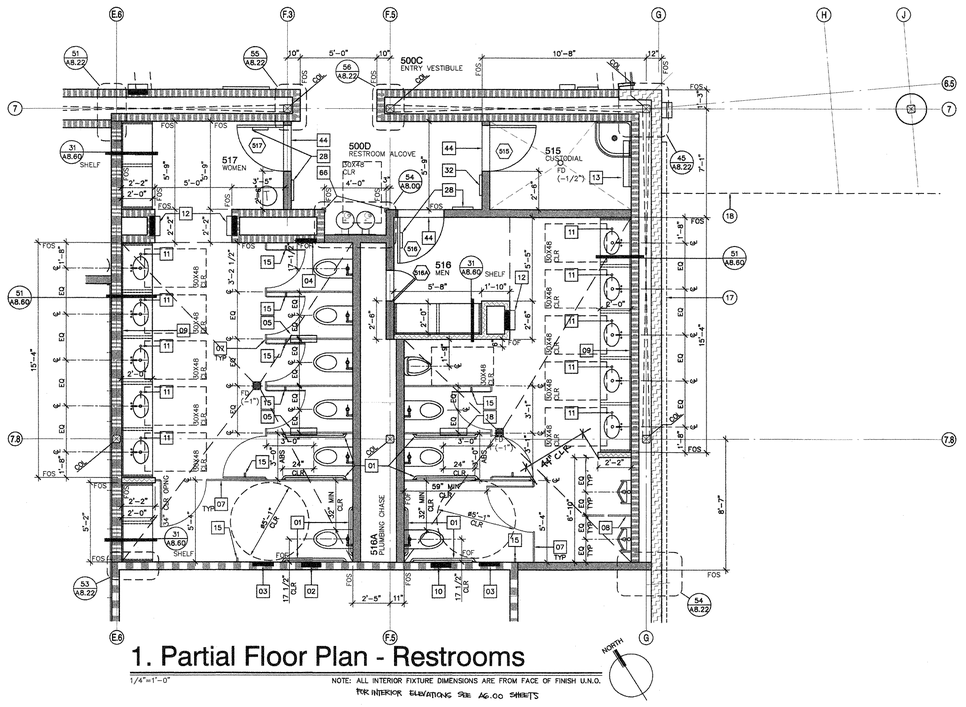
FLOOR PATTERN PLAN

A2.23



2. Partial Floor Plan - Kitchen

1/4"=1'-0"



1. Partial Floor Plan - Restrooms

1/4"=1'-0"

NOTE: ALL INTERIOR FIXTURE DIMENSIONS ARE FROM FACE OF FINISH U.N.O.
FOR INTERIOR ELEVATIONS SEE A6.00 SHEETS

TYPICAL FLOOR PLAN DETAILS

24 A8.00	NON-ACCESSIBLE TOILET STALL
35 A8.00	ACCESSIBLE LAVATORY
34 A8.00	ACCESSIBLE COUNTER LAVATORY
36 A8.00	ACCESSIBLE SINK AT CABINET
54 A8.00	ACCESSIBLE DRINKING FOUNTAIN
25 A8.00	ACCESSIBLE MULTIPLE ACCOMMODATION TOILET STALL
14 A8.00	ACCESSIBLE URINAL
26 A8.00	ACCESSIBLE SINGLE ACCOMMODATION STALL

WALL TYPE LEGEND

NOTE: WHERE RATED PARTITIONS ARE INTERSECTED BY NON-RATED PARTITIONS, CARRY RATING THRU NON-RATED PARTITION

LINE STYLE	DESCRIPTION	
W1	EXTERIOR WALL – 8" METAL STUDS W/ EIFS FINISH, NON-RATED	21 A8.20
W2	INTERIOR WALL – 6" METAL STUDS, FULL HT	22 A8.20
W3	EXTERIOR WALL – 8" METAL STUDS W/ STONE VENEER FINISH NON-RATED, OMIT GYP BD AT INTERIOR OF WALL CAVITY	23 A8.20
W4	EXTERIOR WALL – 6" METAL STUDS W/ ALUMINUM CLADDING FINISH NON-RATED	24 A8.20
W5	6" METAL STUD, FULL HT ONE HOUR RATED	25 A8.20
W6	6" METAL STUD, FULL HT NON-RATED– (2) LAYERS OF GYP BD	26 A8.20
W7	4" METAL STUD, CEILING HT NON-RATED	41 A8.20
W8	6" STAGGERED METAL STUD W/ 8" METAL TRACK, FULL HT SOUND BARRIER, NON-RATED	42 A8.20
W9	6" METAL STUD, FULL HT SINGLE SIDE FINISH (2) LAYERS GYP BD, NON-RATED	43 A8.20
C2.1	TYPICAL STEEL COLUMN, SEE STRUCTURAL FOR ADDITIONAL INFO/SIZES	
C2.1	TYPICAL STEEL COLUMN, SEE STRUCTURAL FOR ADDITIONAL INFO/SIZES	

FLOOR PLAN KEYNOTES

01 RECESSED ENTRY MAT, SEE ACCESSORY SCHEDULE
02 WALL MOUNTED RECESSED MAILBOXES, SEE INTERIOR ELEVATIONS
03 AUTOMATIC DOOR OPENER, SEE DOOR SCHEDULE
04 ROOF HATCH/SCUTTLE/LADDER, VERIFY LOCATION IN FIELD — 45 A8.30
05 MOP SINK, SEE PLUMBING SHEETS FOR MORE INFORMATION
06 THERMOSTAT LOCATION, SEE MECHANICAL
07 EQUIPMENT AT MECHANICAL ROOM, SEE MECHANICAL PLANS FOR MORE INFORMATION
08 NOT USED
09 NOT USED
10 NOT USED
11 ELECTRICAL/COMMUNICATION/PANELS/EQUIPMENT, SEE ELECTRICAL
12 4" ROOF DRAIN LINES UNDER/THRU FOOTING. SEE STRUCTURAL/SITE UTILITY PLANS FOR CONNECTION TO STORM DRAIN LINE. VERIFY ROUTING DOWN WALL IN FIELD, COORDINATE WITH SITE CONDITIONS.
13 6" ASR, SEE DETAIL. REQUIRED BUTTERFLY VALVE/ CHECK VALVE. SEE ELECTRICAL/FIRE SPRINKLER PLANS FOR MORE INFORMATION — 43 A8.11
14 CARD READER, SEE DOOR SCHEDULE
15 STEEL MULLION AT CURTAIN WALL, DEFERRED APPROVAL
16 LINE OF STRUCTURAL BEAM ABOVE, SEE REFLECTED CEILING PLAN
17 BUILDING LETTERS, SEE PLANS
18 LINE OF BUILDING ROOF OVERHANG
19 CEILING SOFFIT LINE, SEE PLANS
20 ANODIZED ALUMINUM COLUMN CLADDING SYSTEM, 23"X23" AT COLUMN UNO

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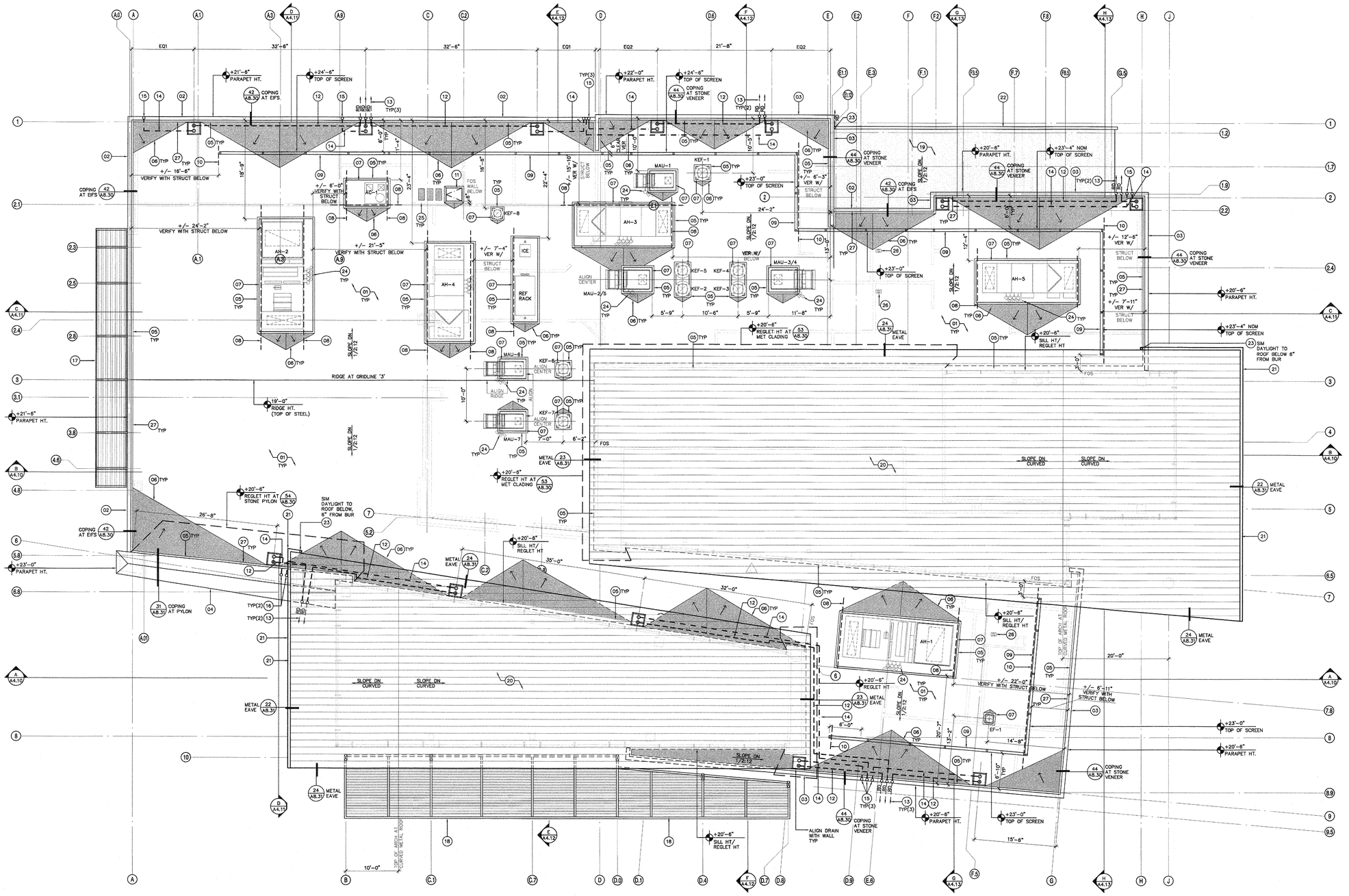
DIMENSIONED PARTIAL FLOOR PLANS

A2.30



Roof Plan

1/8"=1'-0"

GENERAL NOTES

1. IT IS THE INTENT OF THE CONTRACT DOCUMENTS TO PLACE THE RESPONSIBILITY FOR THE WATER-TIGHTNESS OF THE ENTIRE COMPOSITION ROOF UNDER THE ROOFING CONTRACTOR. IN SUBMITTING A BID, THE ROOFING CONTRACTOR AND MANUFACTURER WHOSE MATERIAL HE PROPOSES TO USE, AGREE TO THE CONDITIONS SET FORTH IN ALL THE CONTRACT DOCUMENTS.
2. THEY FURTHER AGREE THAT ALL CONDITIONS AS SET FORTH IN SAID DOCUMENTS ARE COMPLETE AND MEET THEIR SPECIFIC REQUIREMENTS FOR A BONDED ROOF OF THE PERIOD SPECIFIED.
3. IN THE EVENT THE DOCUMENTS DO NOT COMPLETELY OR CORRECTLY COVER THE MANUFACTURERS SPECIFIC REQUIREMENTS, THE ROOFING CONTRACTOR SHALL PROVIDE THE SAME IN HIS BID. UNDER NO CIRCUMSTANCES WILL AN EXTRA BE ALLOWED FOR HIS FAILURE TO COMPLY WITH REQUIREMENTS HEREIN AND MANUFACTURERS WRITTEN REQUIREMENTS.
4. THE DETAILS SHOWN ON THE CONSTRUCTION DOCUMENTS SHALL BE INCORPORATED INTO THE PROJECT AT ALL APPROPRIATE LOCATIONS WHETHER SPECIFICALLY REFLECTED AT EACH LOCATION OR NOT.
5. ALL VENTS THRU ROOF SHALL BE EXTENDED TO 12" MINIMUM DISTANCE ABOVE ROOF DECK.
6. CLEAN ALL GUTTERS AND DRAIN LINES OF DEBRIS PRIOR TO FINAL ACCEPTANCE.
7. ALL ROOF SLOPES ARE APPROXIMATE. SEE SECTIONS FOR ROOF ELEVATIONS.
8. REFER TO MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR ADDITIONAL ROOF PENETRATIONS NOT SHOWN HERE

MATERIAL REQUIREMENTS

1. BUILT UP ROOFING:
   CLASS A – SEE PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS
2. PRE-FINISHED METAL ROOF:
   CLASS A W/ MFR CLOSURES, FLASHING AND ACCESSORIES SEE PROJECT MANUAL
3. INSULATION BOARD MATERIALS:
   A. 4.0 INCH POLY-ISOCYANURATE FOAM BOARD INSULATION-MANUFACTURED AND GUARANTEED BY PRIMARY ROOFING MEMBRANE MANUFACTURER (R-30)

   B. FACTORY TAPERED POLY-ISOCYANURATE FOAM BOARD INSULATION – 1/2" PER FOOT TAPERS, 29" CRICKET ANGLE MINIMUM, UNLESS NOTED OTHERWISE. SEE PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS
4. INSULATION OVERLAY BOARD:
   EXPANDED PERLITE MINERAL AGGREGATE BOARD 1/2" INCH THICK OVER POLY ISO – 10% CONSOLIDATION – SQUARE EDGES. SEE PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.
5. FLASHING:
   ALL ROOFING PENETRATION SHALL BE FLASHED AS DETAILED HEREIN. ALL PLUMBING/ ELECTRICAL PIPE/CONDUIT ETC SHALL BE FLASHED.

TYPICAL DETAILS

21 A8.30	ROOF DRAIN	21 A8.30	RD/OFD DRAINAGE WELL	51 A8.30	PIPE/CONDUIT PENETRATION
21 A8.30	OVERFLOW DRAIN	12 A8.30	STACK FLASHING	55 A8.30	PLATFORM PLAN
31 A8.30	PLUMBING VENT	25 A8.30	EQUIPMENT PLATFORM	13 A8.30	ROOF CRICKET
41 A8.30	OVERFLOW DRAIN SOFFIT	34 A8.30	TYP SHEET MET EXP JOINT	15 A8.30	EQUIPMENT MFR CURB
45 A8.30	ROOF HATCH	32 A8.30	METAL COPING	–	

ROOF PLAN LEGEND

- 1/2" PER FT (UNO) AT TAPERED INSULATION CRICKET (13 A8.30)
- PREFINISHED CURVED METAL ROOFING AT CLERESTORY ROOF (11 A8.31)
- BUILT-UP ROOFING OVER 1/2" INSULATION OVERLAY BD OVER 4" RIGID INSUL OVER MET DECK (13 A8.30)
- PREFINISHED METAL ROOFING AT STEEL CANOPY (11 A8.31)
- RD/OFD COMBO (21 A8.30)
- LINE OF 4" CANT UNDER ROOF OVERHANG
- OVERFLOW DRAIN LEADER
- 4" ROOF DRAIN LEADER
- WALK PADS VER SIZE W/ MFR (14 A8.30)

ROOF PLAN KEYNOTES

01. BUILT-UP ROOFING OVER 1/2" INSULATION OVERLAY BOARD OVER 4" RIGID INSULATION OVER METAL DECK, SEE SPECS
02. COPING AT EIFS PARAPET (42 A8.30)
03. COPING AT STONE VENEER PARAPET (44 A8.30)
04. COPING AT STONE VENEER PYLON (31 A8.31)
05. TYP 4" CANT AT BUILT-UP ROOFING CORNERS
06. TAPERED INSULATION CRICKET, 1/2"/'1'-0" COUNTER SLOPE (13 A8.30)
07. EQUIP PLATFORM-ALIGN W/ STRUCT BELOW AS NOTED (25 A8.30) (15 A8.30) EF
08. STRUCTURAL MEMBER BELOW-SEE STRUCT SHTS ALIGN EQUIPMENT PLATFORM PER DETAIL (29 A8.30)
09. EQUIPMENT SCREEN (35 A8.31)
10. STRUCTURAL MEMBER BELOW, SEE STRUCTURAL SHEETS. ALIGN EQUIPMENT SCREEN PER DETAIL TYP (35 A8.31)
11. ROOF HATCH (45 A8.30)
12. 4" ROOF DRAIN LEADER
13. 4" ROOF DRAIN LINES UNDER/THROUGH FOOTING, SEE STRUCTURAL/SITE UTILITY PLANS FOR CONNECTION TO STORM DRAIN LINE. VERIFY ROUTING DOWN WALL IN FIELD, COORDINATE WITH SITE CONDITIONS
14. 4" OVERFLOW DRAIN LEADER
15. 4" OVERFLOW DRAIN THRU WALL, SEE EXTERIOR ELEVATIONS FOR LOCATIONS
16. 4" OVERFLOW DRAIN AT SOFFIT, SEE CEILING PLAN FOR LOCATIONS
17. WEST TRELLIS, SEE STRUCTURAL (3 S200A)
18. SOUTH TRELLIS, SEE STRUCTURAL (2 S200B)
19. PREFINISHED METAL ROOFING OVER STEEL CANOPY, SEE STRUCTURAL SHEETS/DETAIL (1 S200B)
20. AEP PREFINISHED CURVED SPAN-LOK 16" STRIATED (OR APPROVED EQUAL) OVER SELF-ADHERING COLD-APPLIED RUBBERIZED ASPHALT MEMBRANE OVER 1/2" CDX PLYWD OVER METAL DECK (11 A8.31)
21. GUTTER AT CURVED METAL ROOFING
22. GUTTER AT DELIVERY CANOPY METAL ROOFING
23. 4" DOWN SPOUT-CONNECT TO UNDERGROUND STORM DRAIN LINE-SEE SITE/UTILITY PLANS
24. SEE MECH FOR UTILITIES THROUGH PLATFORM
25. WALK PADS AT ROOF (14 A8.30)
26. ROOF JACK, SEE MECHANICAL (51 A8.30) SIM
27. BACK OF PARAPET WALL 5/8" PLYWOOD SHEATHING/CD EXPOSURE 1. "PLYMETAL TEKS" #10X1-7/16" AT 8" EACH STUD TOP/BOTTOM TRACK, TYP.

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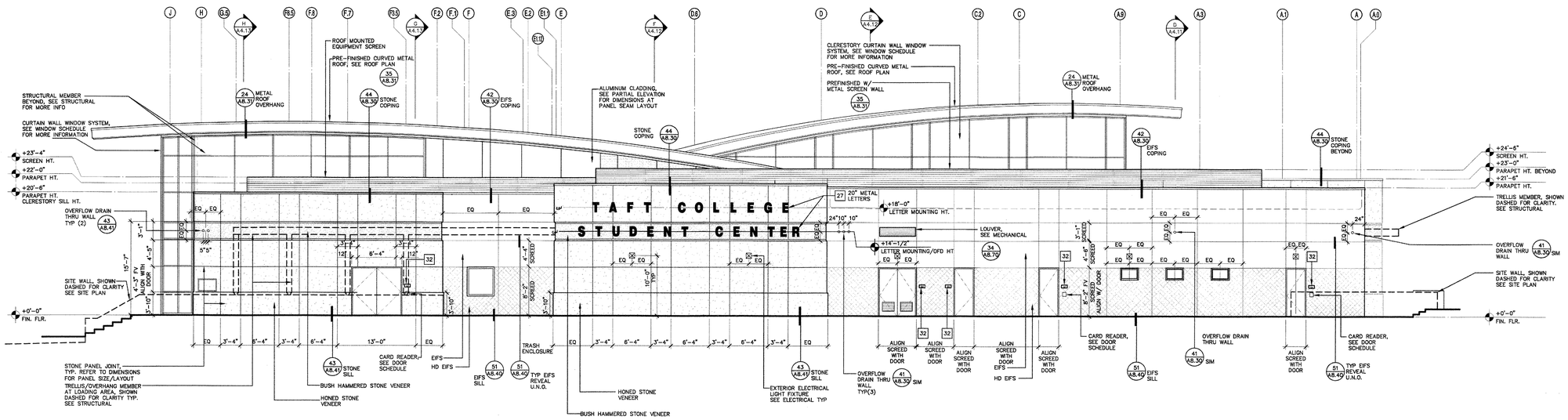
@ROOF-WEIGHT

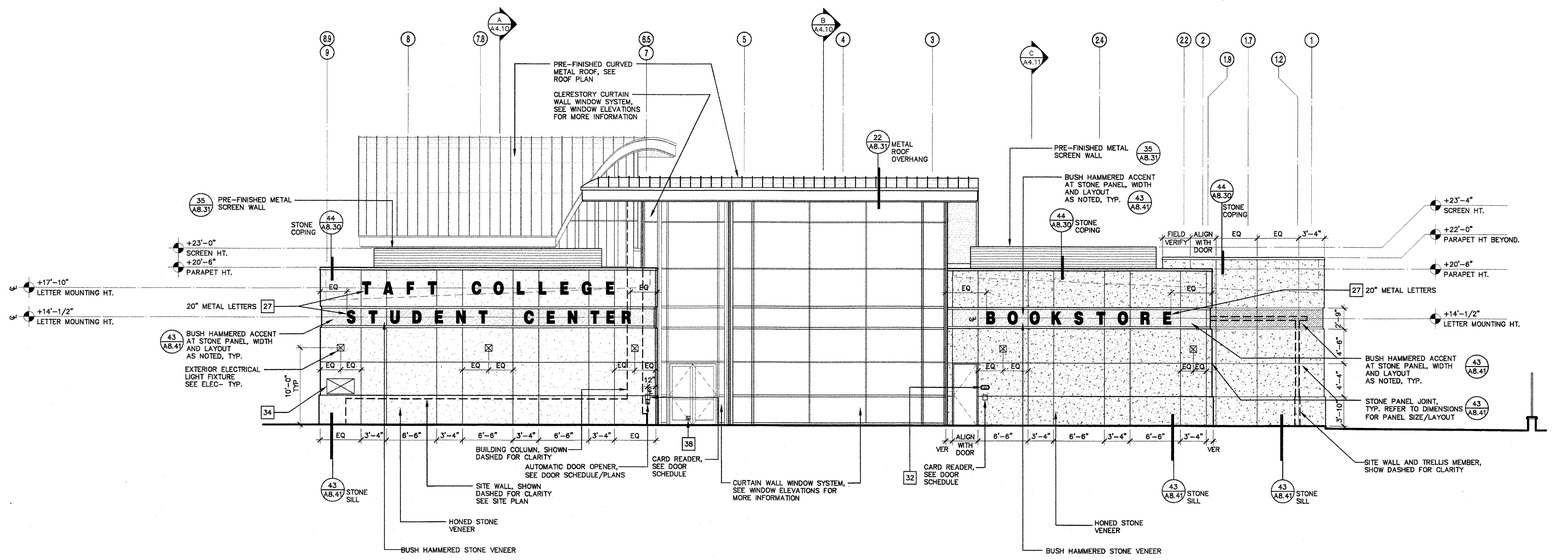
ROOF PLAN

A3.00



A. North Exterior Elevation

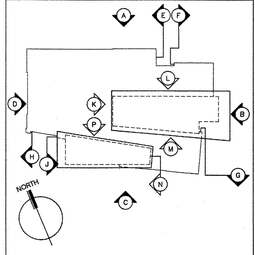
1/8"=1'-0"



B. East Exterior Elevation

1/8"=1'-0"

ELEVATION KEY PLAN



WALL MATERIAL LEGEND

HATCH TYPE	DESCRIPTION	DETAIL
	EIFS FINISH STANDARD FINISH HD FINISH	51 A8.40
	STONE VENEER FINISH HONED FINISH BUSH HAMMERED ACCENT FINISH	43 A8.41
	ALUMINUM CLADDING	51 A8.42
	PRE-FINISHED METAL SCREEN WALL	35 A8.31

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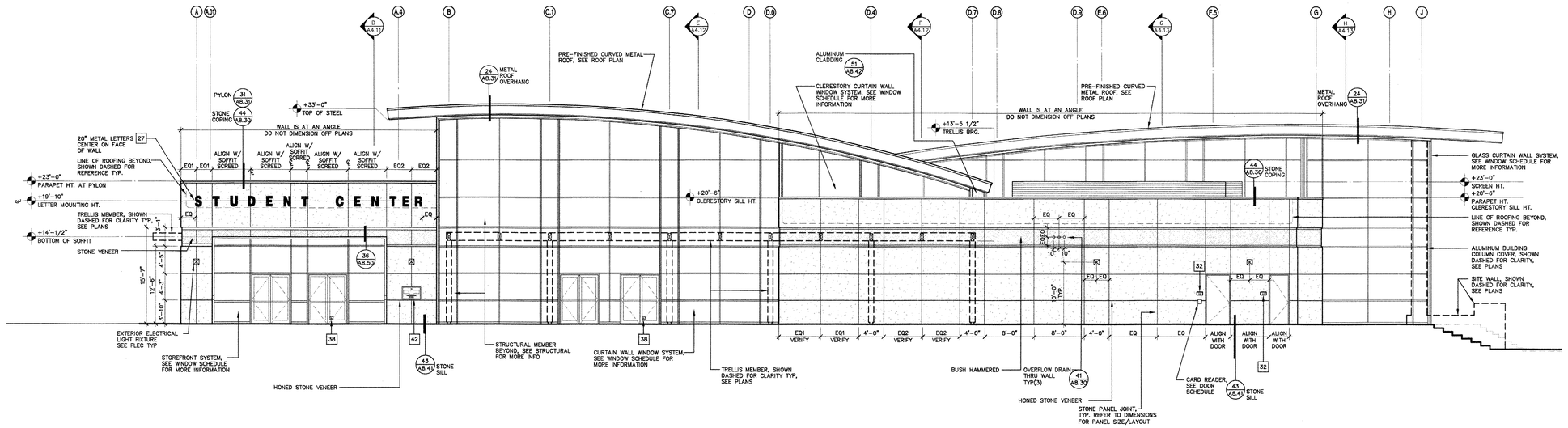
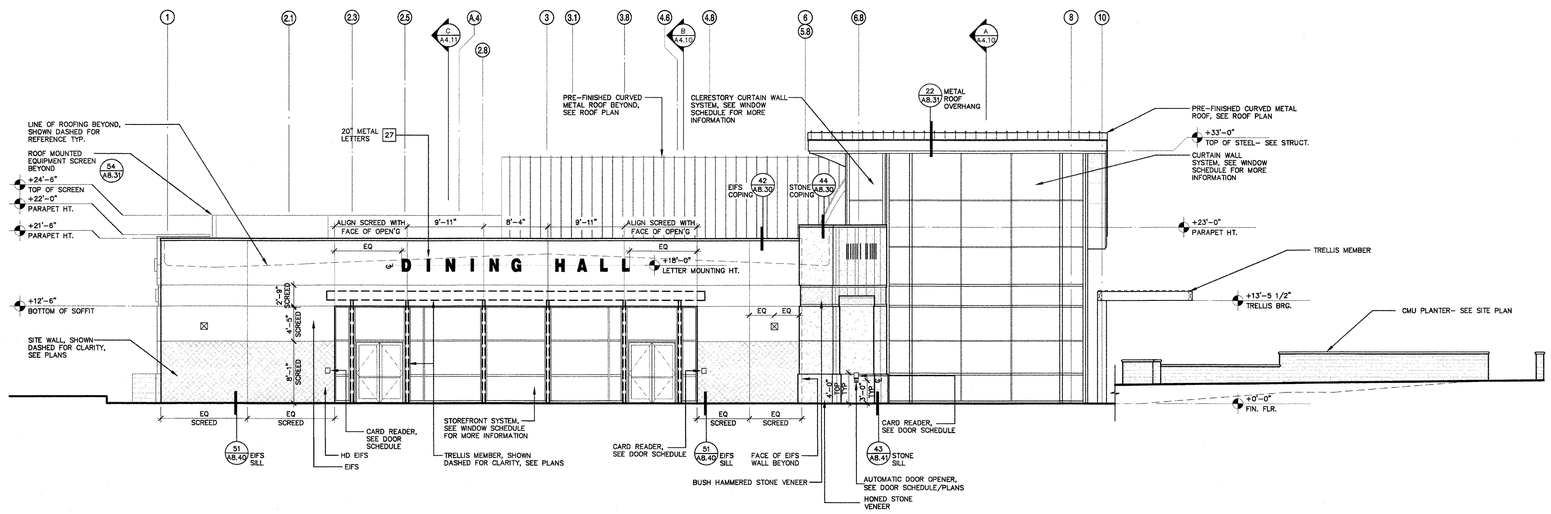
EXTERIOR ELEVATIONS

A4.00



C. South Exterior Elevation

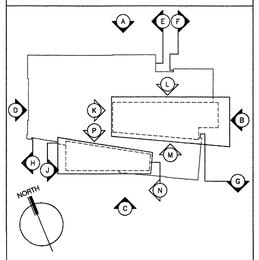
1/8"=1'-0"



D. West Exterior Elevation

1/8"=1'-0"

ELEVATION KEY PLAN



WALL MATERIAL LEGEND

HATCH TYPE	DESCRIPTION	DETAIL
	EIFS FINISH STANDARD FINISH HD FINISH	51/A8.40
	STONE VENEER FINISH HONED FINISH BUSH HAMMERED ACCENT FINISH	43/A8.41
	ALUMINUM CLADDING	51/A8.42
	PRE-FINISHED METAL SCREEN WALL	35/A8.31

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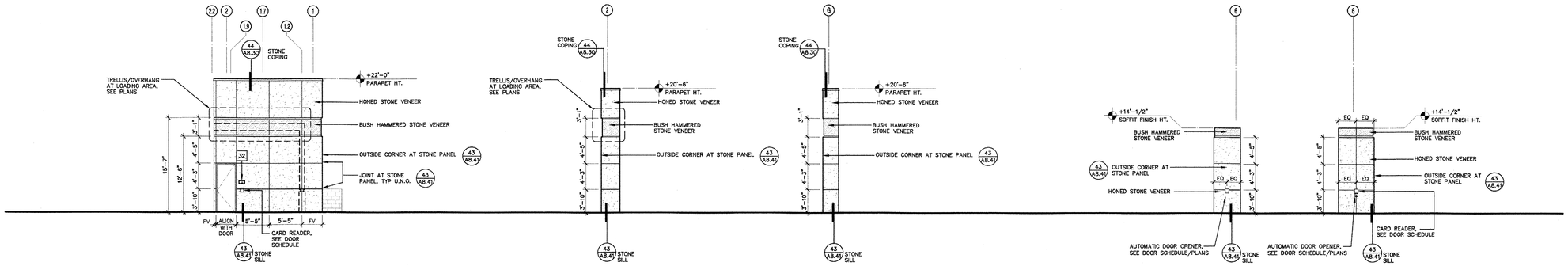
EXTERIOR ELEVATIONS

A4.01



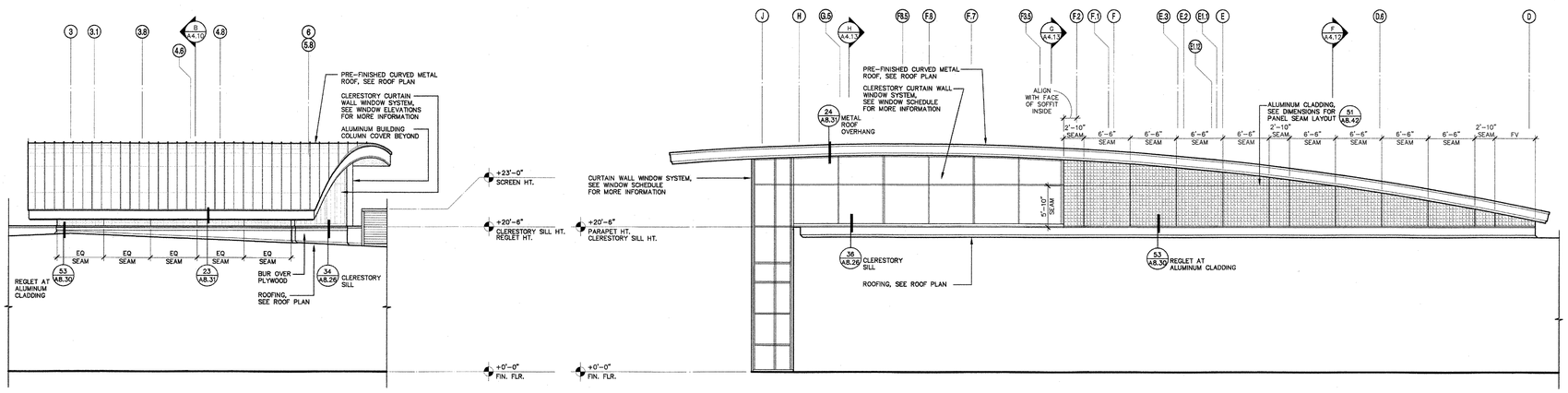
E. Partial Exterior Elevation
1/8"=1'-0"

F. Partial Exterior Elevation
1/8"=1'-0"

G. Partial Exterior Elevation
1/8"=1'-0"

H. Partial Exterior Elevation
1/8"=1'-0"

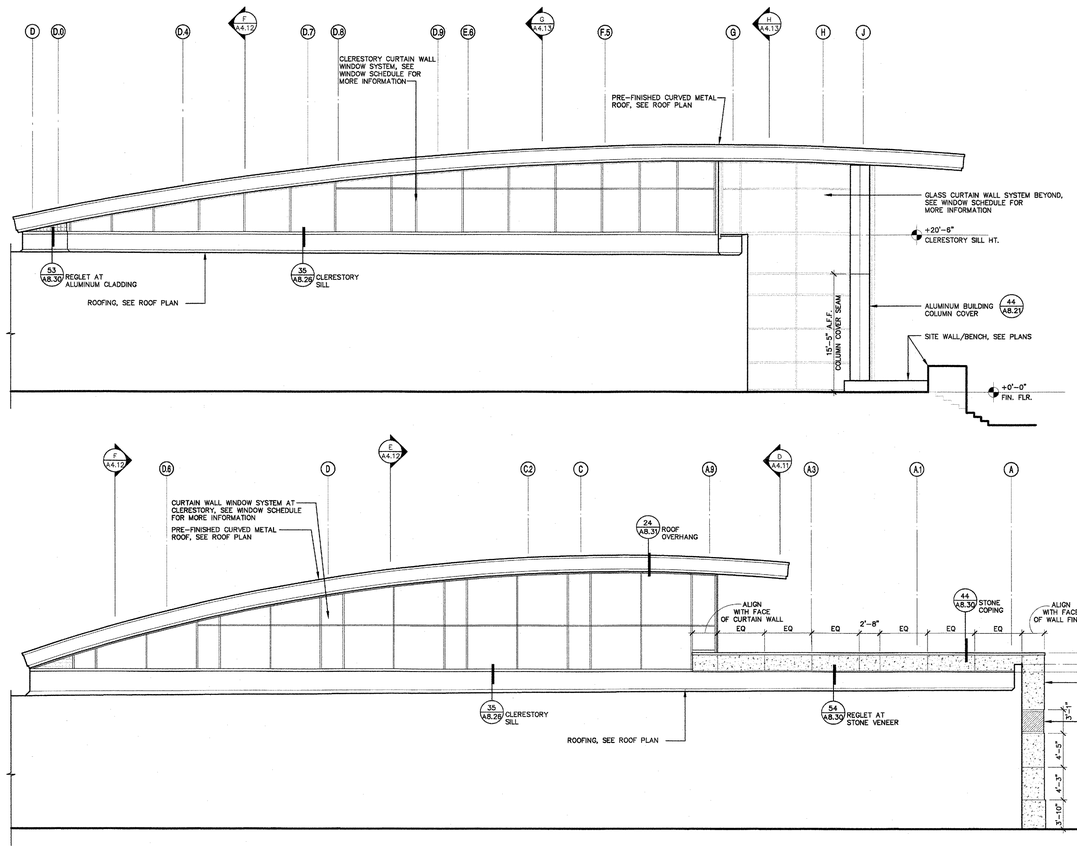
J. Partial Exterior Elevation
1/8"=1'-0"



K. Partial Exterior Elevation
1/8"=1'-0"

L. Partial Exterior Elevation
1/8"=1'-0"

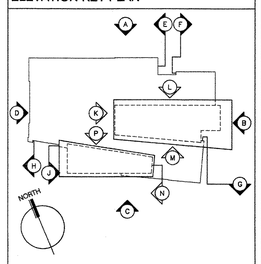
N. Partial Exterior Elevation
1/8"=1'-0"



M. Partial Exterior Elevation
1/8"=1'-0"

P. Partial Exterior Elevation
1/8"=1'-0"

ELEVATION KEY PLAN



WALL MATERIAL LEGEND

HATCH TYPE	DESCRIPTION	DETAIL
	FIFS FINISH STANDARD FINISH HD FINISH	51 A8.40
	STONE VENEER FINISH HONED FINISH BUSH HAMMERED ACCENT FINISH	43 A8.41
	ALUMINUM CLADDING	51 A8.42
	PRE-FINISHED METAL SCREEN WALL	35 A8.31

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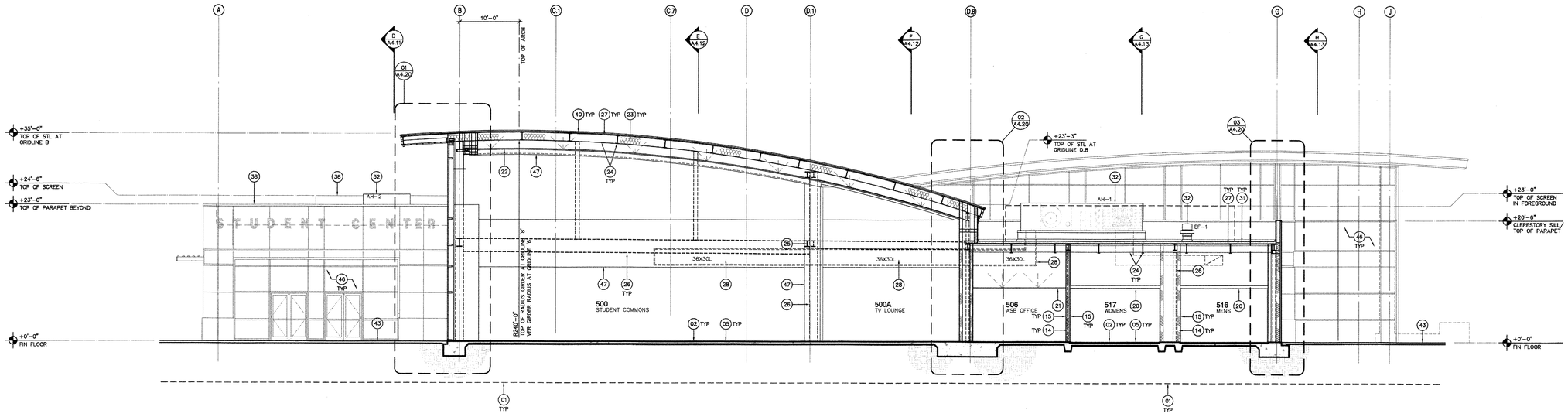
1	00.00.00	DESCRIPTION

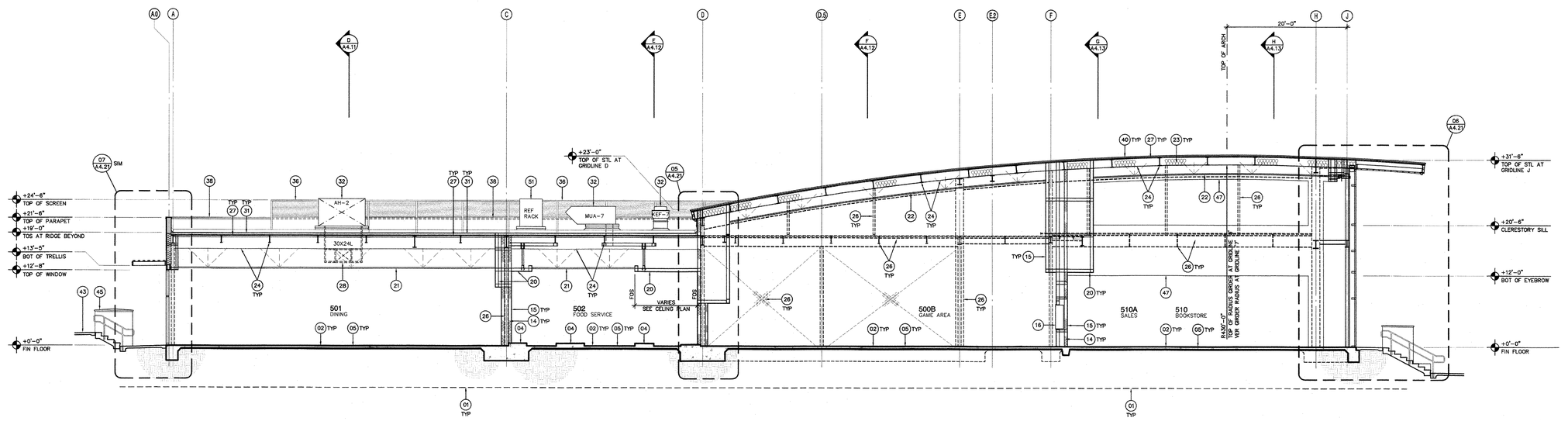
EXTERIOR ELEVATIONS

A4.02



A. Building Section

1/8"=1'-0"



B. Building Section

1/8"=1'-0"

GENERAL SECTION NOTES

SECTION KEYNOTES

01 APPROX. LINE OF OVER EXCAVATION LIMIT (12/S1.04) SEE STRUCT SHEETS AND SOILS REPORTS.
02 CONC SLAB/FOOTING–SEE STRUCT SHEETS
03 DEPRESSED CONC SLAB–SEE STRUCT SHEETS
04 CONC PAD AT EQUIPMENT–SEE STRUCT SHEETS (17/S1.04)
05 FLOOR FINISH–SEE PLANS/FINISH SCHEDULE
06 RECESSED FLOOR MAT–SEE FLOOR PLAN
07 CURTAIN WALL, FULL HT (DEFERRED APPROVAL) (51/A8.73)
08 CURTAIN WALL AT CLERESTORY (DEFERRED APPROVAL) (51/A8.73)
09 EXTERIOR STOREFRONT DOORS/WINDOWS (22/A8.71)
10 INTERIOR STOREFRONT (23/A8.71) (24/A8.71)
11 EIFS FINISH–SEE EXTERIOR ELEVATIONS (51/A8.40)
12 EXTERIOR STONE VENEER FINISH–SEE EXT ELEVS (43/A8.41)
13 EXTERIOR ALUM CLADDING–SEE EXT ELEVS (51/A8.42)
14 METAL STUD WALL–SEE FLOOR PLANS
15 INTERIOR WALL FINISH–SEE FINISH SCHEDULE/INT ELEVS
16 MAILBOX ALCOVE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
17 RECESSED DISPLAY CASE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
18 CUSTOM BUILT–IN DISPLAY CASE–SEE FLOOR PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
19 DIRECT APPLIED FINISH SYSTEM AT SOFFIT CEILING SEE CEILING PLANS
20 GYP BD CEILING/SOFFIT–SEE CEILING PLAN SEE STRUCT SHEETS FOR FRAMING
21 SUSPENDED CEILING–SEE CEILING PLAN
22 SUSPENDED CEILING, CURVED–SEE CEILING PLAN
23 R–38 BATT INSULATION–TYP AT METAL ROOF
24 STRUCTURAL STEEL MEMBERS–SEE STRUCT SHEETS
25 STRUCTURAL STEEL MEMBERS, EXPOSED–SEE STRUCT SHEETS–FINISH PER CEILING PLAN
26 STRUCTURAL MEMBERS BEYOND–SHOWN FOR REFERENCE ONLY–SEE STRUCT SHEETS
27 METAL DECK–SEE STRUCT SHEETS
28 HVAC MAIN DUCT BEYOND–SHOWN FOR REFERENCE ONLY SEE MECH SHEETS
29 HYDRONIC PIPES BEYOND–SHOWN FOR REFERENCE ONLY SEE MECH SHEETS
30 FIRE SPRINKLER MAIN PIPE–SHOWN FOR REFERENCE ONLY SEE FIRE SPRINKLER SHEETS
31 BUILT–UP ROOFING OVER 1/2" OVERLAY BOARD OVER RIGID INSULATION OVER METAL DECK–SEE ROOF PLAN
32 ROOFTOP MECH EQUIPMENT–SEE ROOF PLAN/MECH SHEETS
33 CANOPY STRUCTURE–SEE STRUCT SHEETS
34 CANOPY ROOFING–SEE ROOF PLAN
35 EQUIPMENT SCREEN–SEE STRUCT SHEETS/DETAIL (35/A8.31)
36 LINE OF EQUIPMENT SCREEN BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
37 ROOF PARAPET–SEE ROOF PLAN
38 LINE OF ROOF PARAPET BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
39 ROOF PYLON–SEE ROOF PLAN SEE STRUCT SHEETS FOR FRAMING
40 PREFINISHED CURVED METAL ROOFING OVER SELF–ADHERING COLD–APPLIED RUBBERIZED ASPHALT MEMBRANE OVER 1/2" CDX PLYWD OVER METAL DECK
41 STEEL TRELLIS–SEE STRUCT SHEETS
42 PREFINISHED METAL SOFFIT (54/A8.50)
43 SITE CONC PAVING–SEE SITE PLAN
44 EXTERIOR CONC STAIRS–SEE SITE PLAN
45 MASONRY SITE WALL–SEE SITE PLAN
46 EXTERIOR ELEVATION BEYOND–SHOWN FOR REFERENCE ONLY–SEE EXTERIOR ELEVATIONS
47 LINE OF WALL/CEILING/SOFFIT BEYOND SHOWN FOR REFERENCE ONLY–SEE FLOOR/CEILING PLANS
48 SEISMIC BRACE AT CEILING HT PARTITION–SEE STRUCT SHTS (18/S1.06)
49 CEILING HT WALL CONNECTION TO GYP BD SOFFIT–SEE STRUCT SHEETS FOR FRAMING
50 GREASE INTERCEPTOR–SEE SITE/UTIL PLANS AND PLBG SHTS
51 ROOFTOP KITCHEN EQUIP–SEE ROOF PLAN/KITCHEN SHEETS (23/A8.30)

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CONSULTANT

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PROJECT INFO

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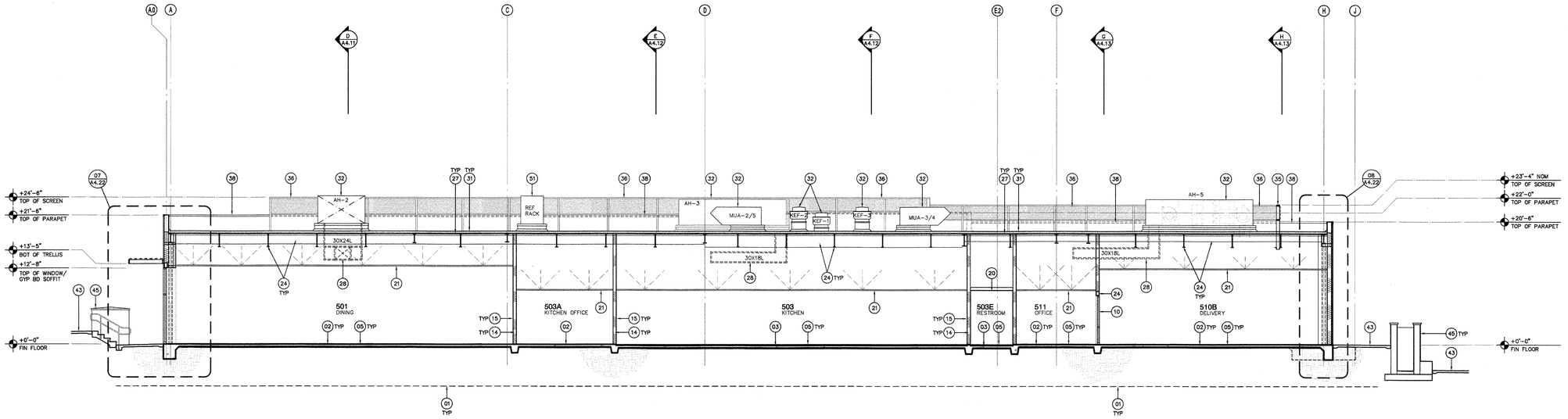
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

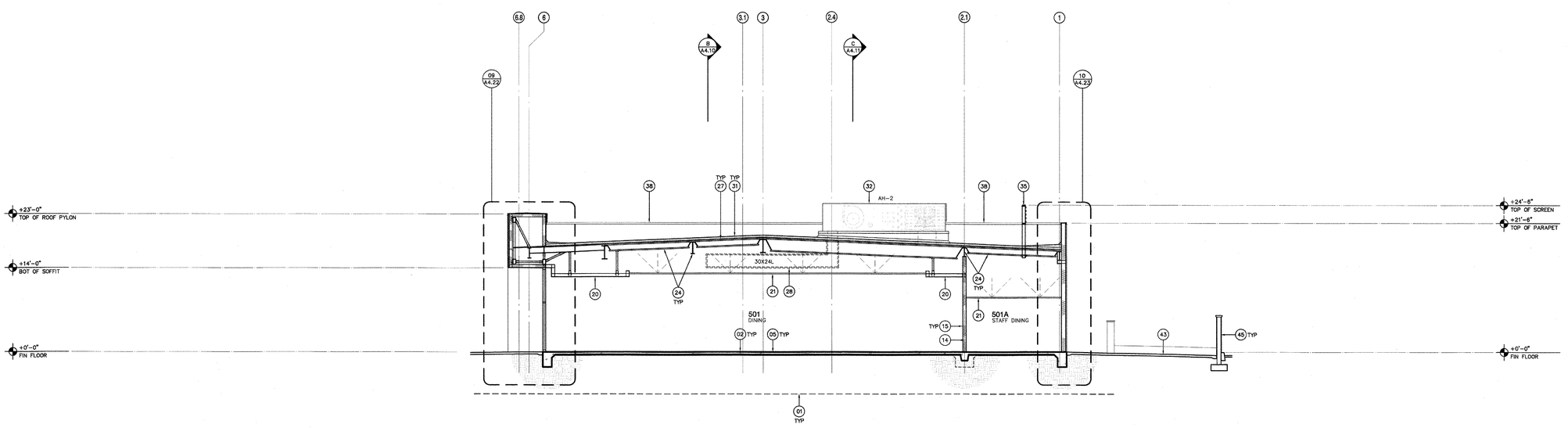
A BLDG SECTION
B BLDG SECTION

A4.10



C. Building Section

1/8"=1'-0"



D. Building Section

1/8"=1'-0"

GENERAL SECTION NOTES

SECTION KEYNOTES

01 APPROX. LINE OF OVER EXCAVATION LIMIT SEE STRUCT SHEETS AND SOILS REPORTS. (12 S1.04)
02 CONC SLAB/FOOTING–SEE STRUCT SHEETS
03 DEPRESSED CONC SLAB–SEE STRUCT SHEETS
04 CONC PAD AT EQUIPMENT–SEE STRUCT SHEETS (17 S1.04)
05 FLOOR FINISH–SEE PLANS/FINISH SCHEDULE
06 RECESSED FLOOR MAT–SEE FLOOR PLAN
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08 CURTAIN WALL AT CLERESTORY (DEFERRED APPROVAL) (51 A8.72)
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10 INTERIOR STOREFRONT (23 A8.71) (24 A8.71)
11 EIFS FINISH–SEE EXTERIOR ELEVATIONS (51 A8.40)
12 EXTERIOR STONE VENEER FINISH–SEE EXT ELEVS (43 A8.41)
13 EXTERIOR ALUM CLADDING–SEE EXT ELEVS (51 A8.42)
14 METAL STUD WALL–SEE FLOOR PLAN
15 INTERIOR WALL FINISH–SEE FINISH SCHEDULE/INT ELEVS
16 MAILBOX ALCOVE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
17 RECESSED DISPLAY CASE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
18 CUSTOM BUILT–IN DISPLAY CASE–SEE FLOOR PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
19 DIRECT APPLIED FINISH SYSTEM AT SOFFIT CEILING SEE CEILING PLANS
20 GYP BD CEILING/SOFFIT–SEE CEILING PLAN SEE STRUCT SHEETS FOR FRAMING
21 SUSPENDED CEILING–SEE CEILING PLAN
22 SUSPENDED CEILING, CURVED–SEE CEILING PLAN
23 R–38 BATT INSULATION–TYP AT METAL ROOF
24 STRUCTURAL STEEL MEMBERS–SEE STRUCT SHEETS
25 STRUCTURAL STEEL MEMBERS, EXPOSED–SEE STRUCT SHEETS–FINISH PER CEILING PLAN
26 STRUCTURAL MEMBERS BEYOND–SHOWN FOR REFERENCE ONLY–SEE STRUCT SHEETS
27 METAL DECK–SEE STRUCT SHEETS
28 HVAC MAIN DUCT BEYOND–SHOWN FOR REFERENCE ONLY SEE MECH SHEETS
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30 FIRE SPRINKLER MAIN PIPE–SHOWN FOR REFERENCE ONLY SEE FIRE SPRINKLER SHEETS
31 BUILT–UP ROOFING OVER 1/2" OVERLAY BOARD OVER RIGID INSULATION OVER METAL DECK–SEE ROOF PLAN
32 ROOFTOP MECH EQUIPMENT–SEE ROOF PLAN/MECH SHEETS
33 CANOPY STRUCTURE–SEE STRUCT SHEETS
34 CANOPY ROOFING–SEE ROOF PLAN
35 EQUIPMENT SCREEN–SEE STRUCT SHEETS/DETAIL (35 A8.31)
36 LINE OF EQUIPMENT SCREEN BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
37 ROOF PARAPET–SEE ROOF PLAN
38 LINE OF ROOF PARAPET BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
39 ROOF PYLON–SEE ROOF PLAN SEE STRUCT SHEETS FOR FRAMING
40 PREFINISHED CURVED METAL ROOFING OVER SELF–ADHERING COLD–APPLIED RUBBERIZED ASPHALT MEMBRANE OVER 1/2" CDX PLYWD OVER METAL DECK
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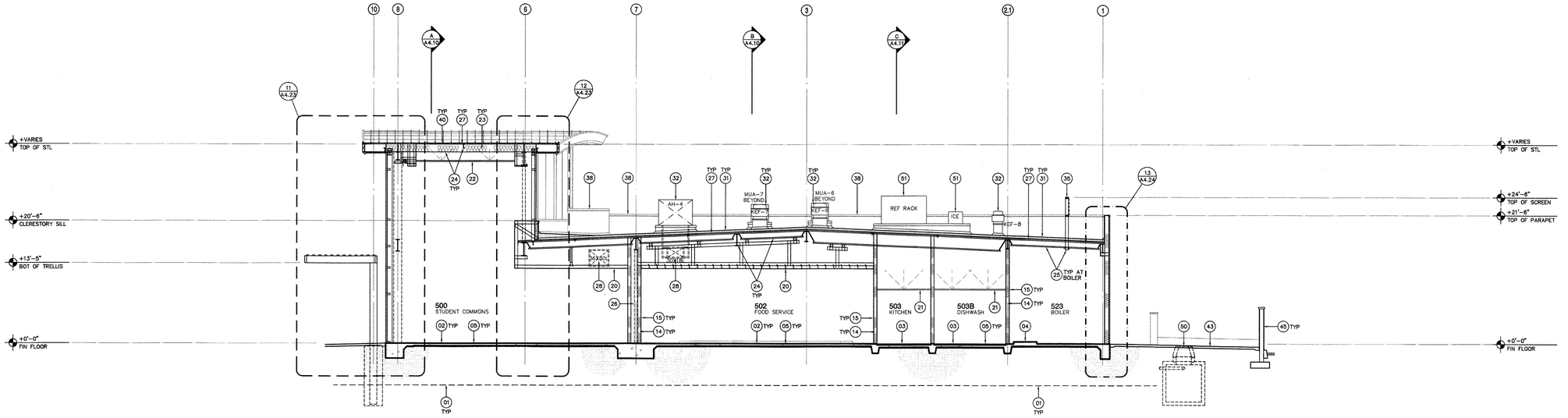
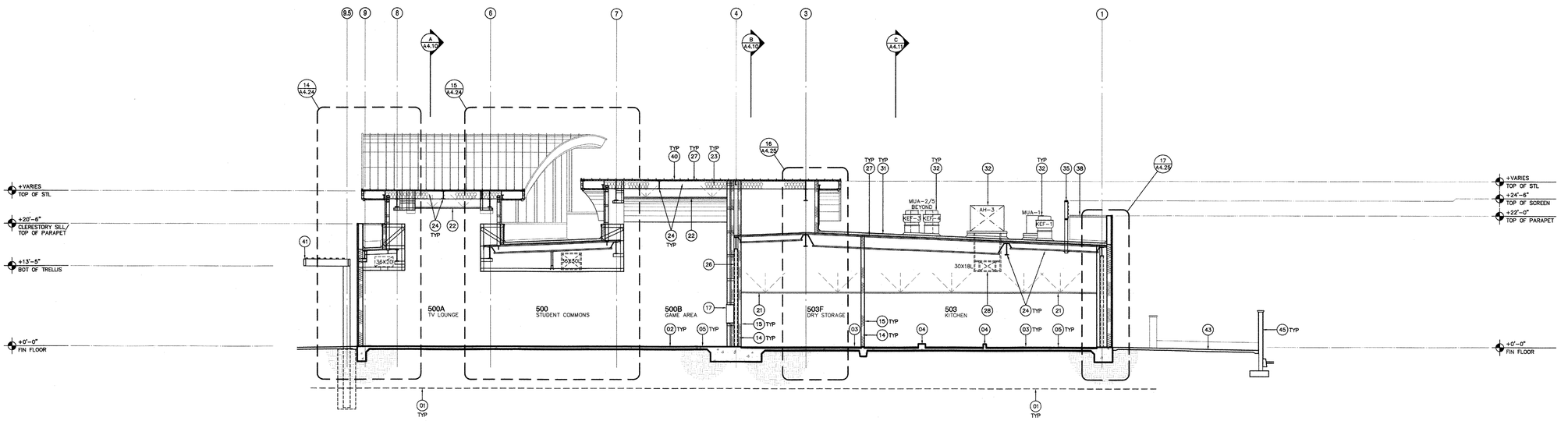
C BLDG SECTION
D BLDG SECTION

A4.11



E. Building Section

1/8"=1'-0"



F. Building Section

1/8"=1'-0"

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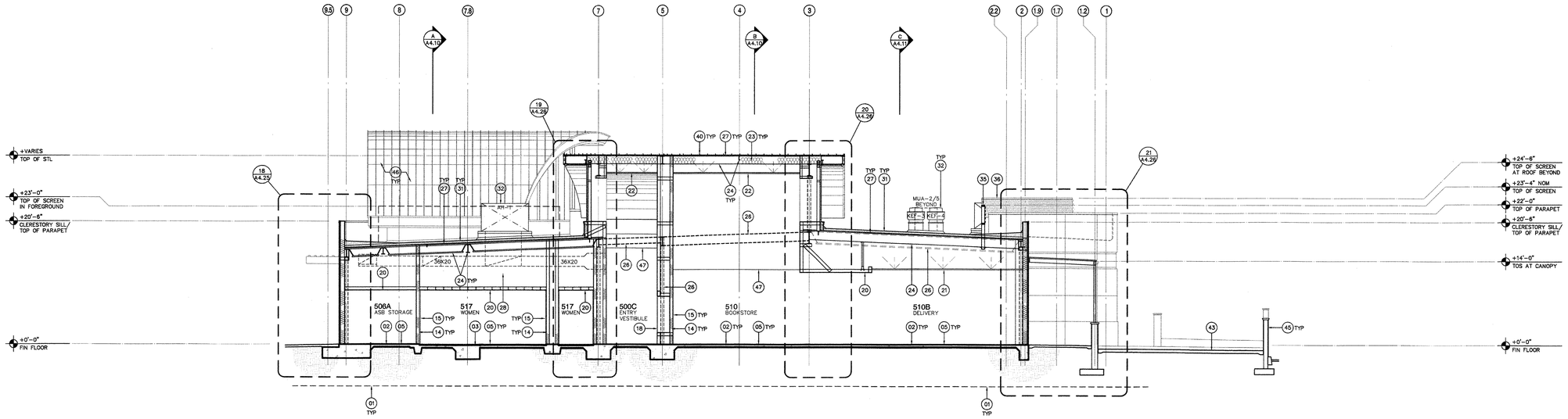
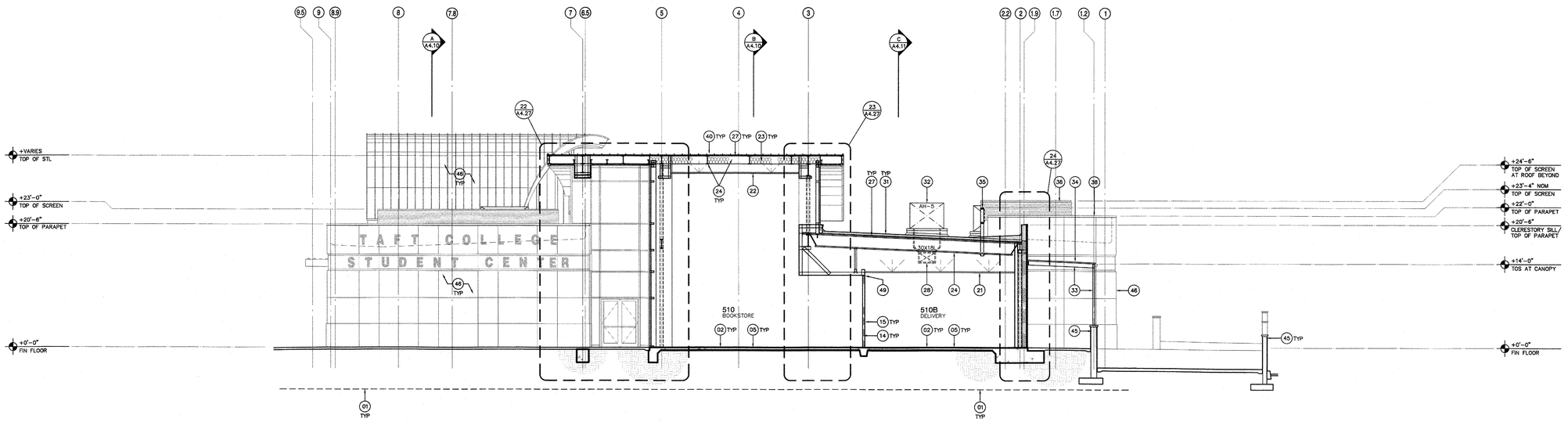
E BLDG SECTION
F BLDG SECTION

A4.12



G. Building Section

1/8"=1'-0"



H. Building Section

1/8"=1'-0"

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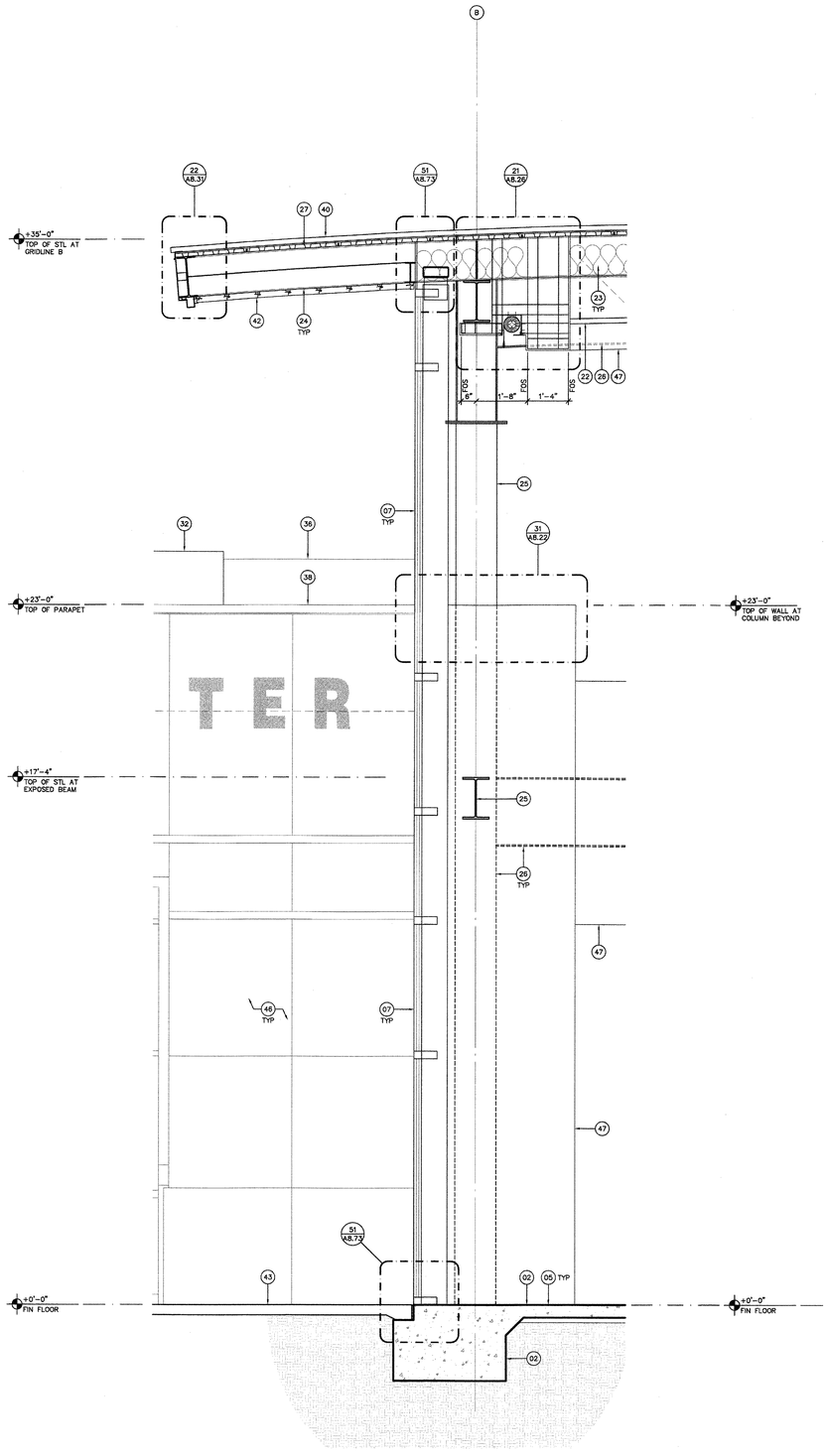
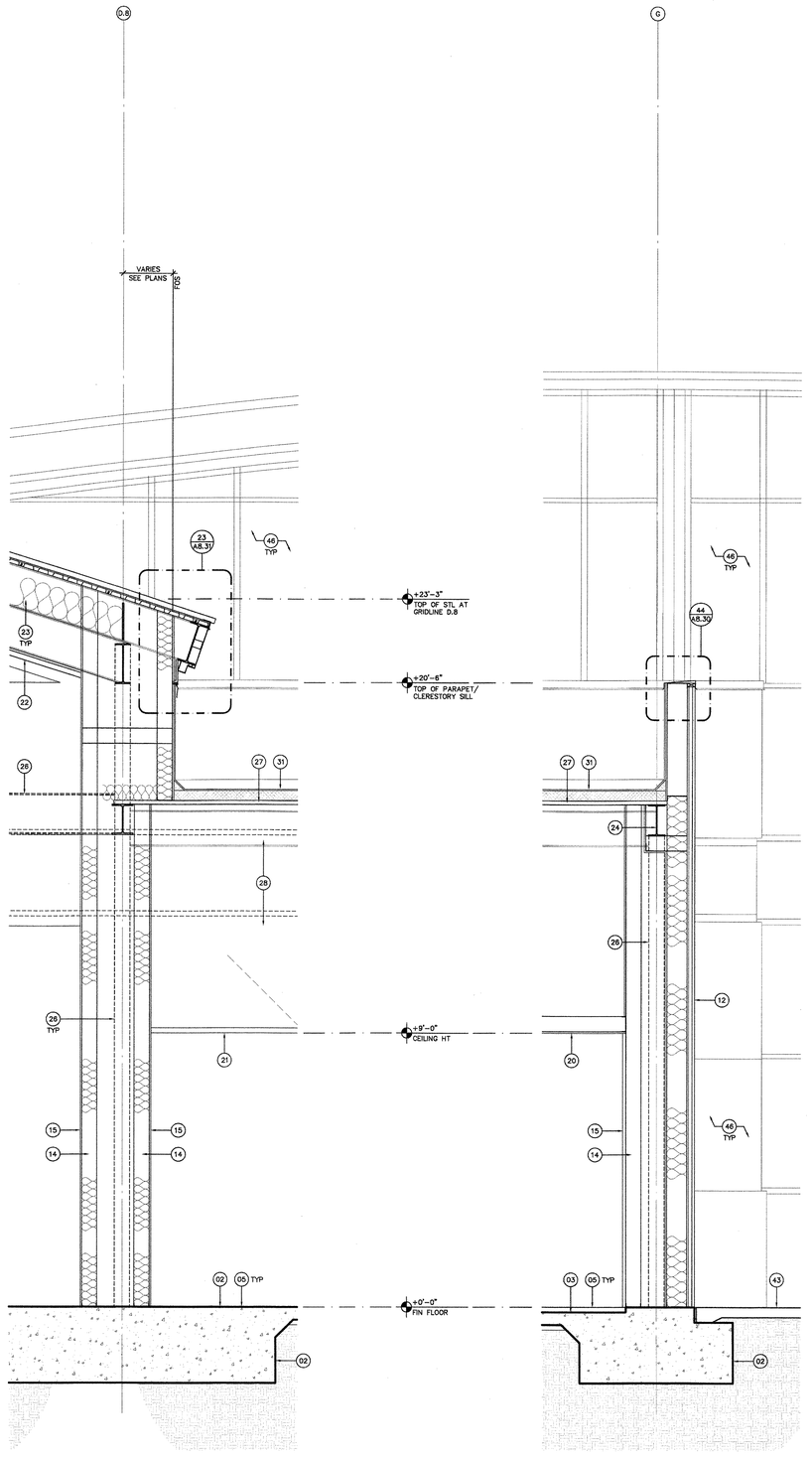
G BLDG SECTION
H BLDG SECTION

A4.13



01 Wall Section

1/2"=1'-0"



02 Wall Section

1/2"=1'-0"

03 Wall Section

1/2"=1'-0"

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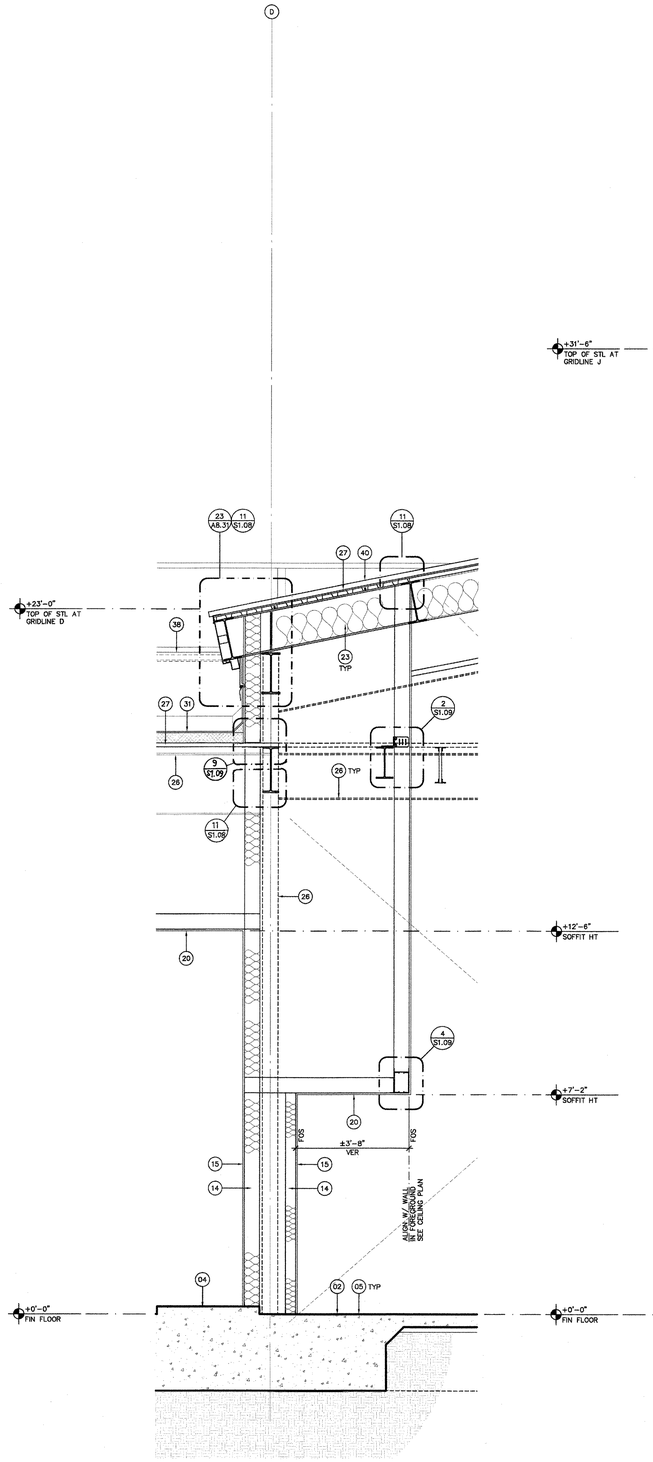
03 WALL SECTION

A4.20



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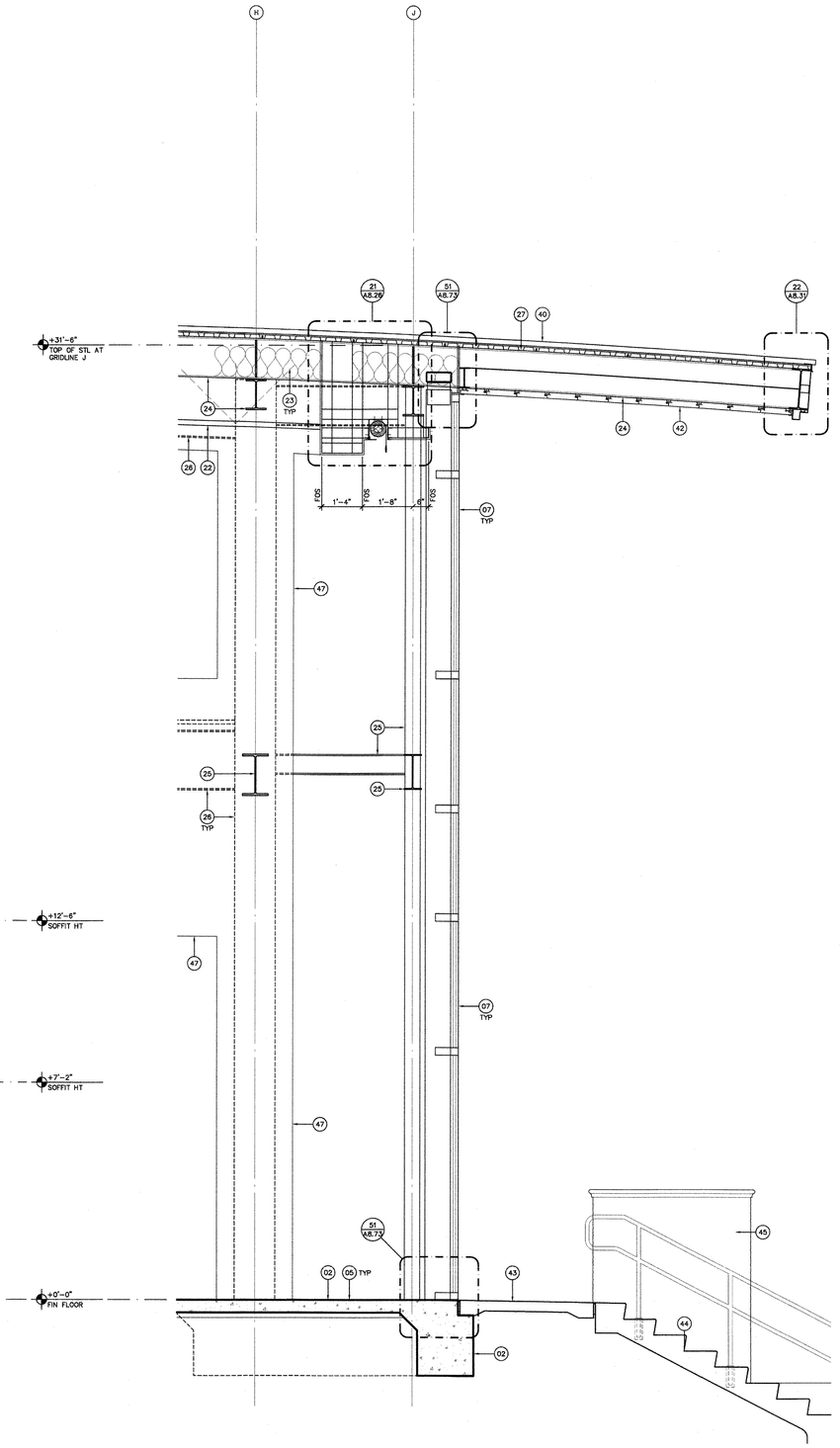

05 Wall Section

1/2"=1'-0"

06 Wall Section

1/2"=1'-0"

GENERAL SECTION NOTES

SECTION KEYNOTES

01 APPROX. LINE OF OVER EXCAVATION LIMIT SEE STRUCT SHEETS AND SOILS REPORTS. (12 S1.04)
02 CONC SLAB/FOOTING–SEE STRUCT SHEETS
03 DEPRESSED CONC SLAB–SEE STRUCT SHEETS
04 CONC PAD AT EQUIPMENT–SEE STRUCT SHEETS (17 S1.04)
05 FLOOR FINISH–SEE PLANS/FINISH SCHEDULE
06 RECESSED FLOOR MAT–SEE FLOOR PLAN
07 CURTAIN WALL, FULL HT (DEFERRED APPROVAL) (51 A8.73)
08 CURTAIN WALL AT CLERESTORY (DEFERRED APPROVAL) (51 A8.73)
09 EXTERIOR STOREFRONT DOORS/WINDOWS (22 A8.71)
10 INTERIOR STOREFRONT (23 A8.71) (24 A8.71)
11 EIFS FINISH–SEE EXTERIOR ELEVATIONS (51 A8.40)
12 EXTERIOR STONE VENEER FINISH–SEE EXT ELEVS (43 A8.41)
13 EXTERIOR ALUM CLADDING–SEE EXT ELEVS (51 A8.42)
14 METAL STUD WALL–SEE FLOOR PLAN
15 INTERIOR WALL FINISH–SEE FINISH SCHEDULE/INT ELEVS
16 MAILBOX ALCOVE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
17 RECESSED DISPLAY CASE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
18 CUSTOM BUILT–IN DISPLAY CASE–SEE FLOOR PLAN/INT ELEVS. SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
19 DIRECT APPLIED FINISH SYSTEM AT SOFFIT CEILING SEE CEILING PLANS
20 GYP BD CEILING/SOFFIT–SEE CEILING PLAN SEE STRUCT SHEETS FOR FRAMING
21 SUSPENDED CEILING–SEE CEILING PLAN
22 SUSPENDED CEILING, CURVED–SEE CEILING PLAN
23 R–38 BATT INSULATION–TYP AT METAL ROOF
24 STRUCTURAL STEEL MEMBERS–SEE STRUCT SHEETS
25 STRUCTURAL STEEL MEMBERS, EXPOSED–SEE STRUCT SHEETS–FINISH PER CEILING PLAN
26 STRUCTURAL MEMBERS BEYOND–SHOWN FOR REFERENCE ONLY–SEE STRUCT SHEETS
27 METAL DECK–SEE STRUCT SHEETS
28 HVAC MAIN DUCT BEYOND–SHOWN FOR REFERENCE ONLY SEE MECH SHEETS
29 HYDRONIC PIPES BEYOND–SHOWN FOR REFERENCE ONLY SEE MECH SHEETS
30 FIRE SPRINKLER MAIN PIPE–SHOWN FOR REFERENCE ONLY SEE FIRE SPRINKLER SHEETS
31 BUILT–UP ROOFING OVER 1/2" OVERLAY BOARD OVER RIGID INSULATION OVER METAL DECK–SEE ROOF PLAN
32 ROOFTOP MECH EQUIPMENT–SEE ROOF PLAN/MECH SHEETS
33 CANOPY STRUCTURE–SEE STRUCT SHEETS
34 CANOPY ROOFING–SEE ROOF PLAN
35 EQUIPMENT SCREEN–SEE STRUCT SHEETS/DETAIL (35 A8.31)
36 LINE OF EQUIPMENT SCREEN BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
37 ROOF PARAPET–SEE ROOF PLAN
38 LINE OF ROOF PARAPET BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
39 ROOF PYLON–SEE ROOF PLAN SEE STRUCT SHEETS FOR FRAMING
40 PREFINISHED CURVED METAL ROOFING OVER SELF–ADHERING COLD–APPLIED RUBBERIZED ASPHALT MEMBRANE OVER 1/2" CDX PLYWD OVER METAL DECK
41 STEEL TRELLIS–SEE STRUCT SHEETS
42 PREFINISHED METAL SOFFIT (54 A8.50)
43 SITE CONC PAVING–SEE SITE PLAN
44 EXTERIOR CONC STAIRS–SEE SITE PLAN
45 MASONRY SITE WALL–SEE SITE PLAN
46 EXTERIOR ELEVATION BEYOND–SHOWN FOR REFERENCE ONLY–SEE EXTERIOR ELEVATIONS
47 LINE OF WALL/CEILING/SOFFIT BEYOND SHOWN FOR REFERENCE ONLY–SEE FLOOR/CEILING PLANS
48 SEISMIC BRACE AT CEILING HT PARTITION–SEE STRUCT SHTS (16 S1.08)
49 CEILING HT WALL CONNECTION TO GYP BD SOFFIT–SEE STRUCT SHEETS FOR FRAMING
50 GREASE INTERCEPTOR–SEE SITE/UTIL PLANS AND PLBG SHTS
51 ROOFTOP KITCHEN EQUIP–SEE ROOF PLAN/KITCHEN SHEETS (25 A8.30)

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REVISIONS

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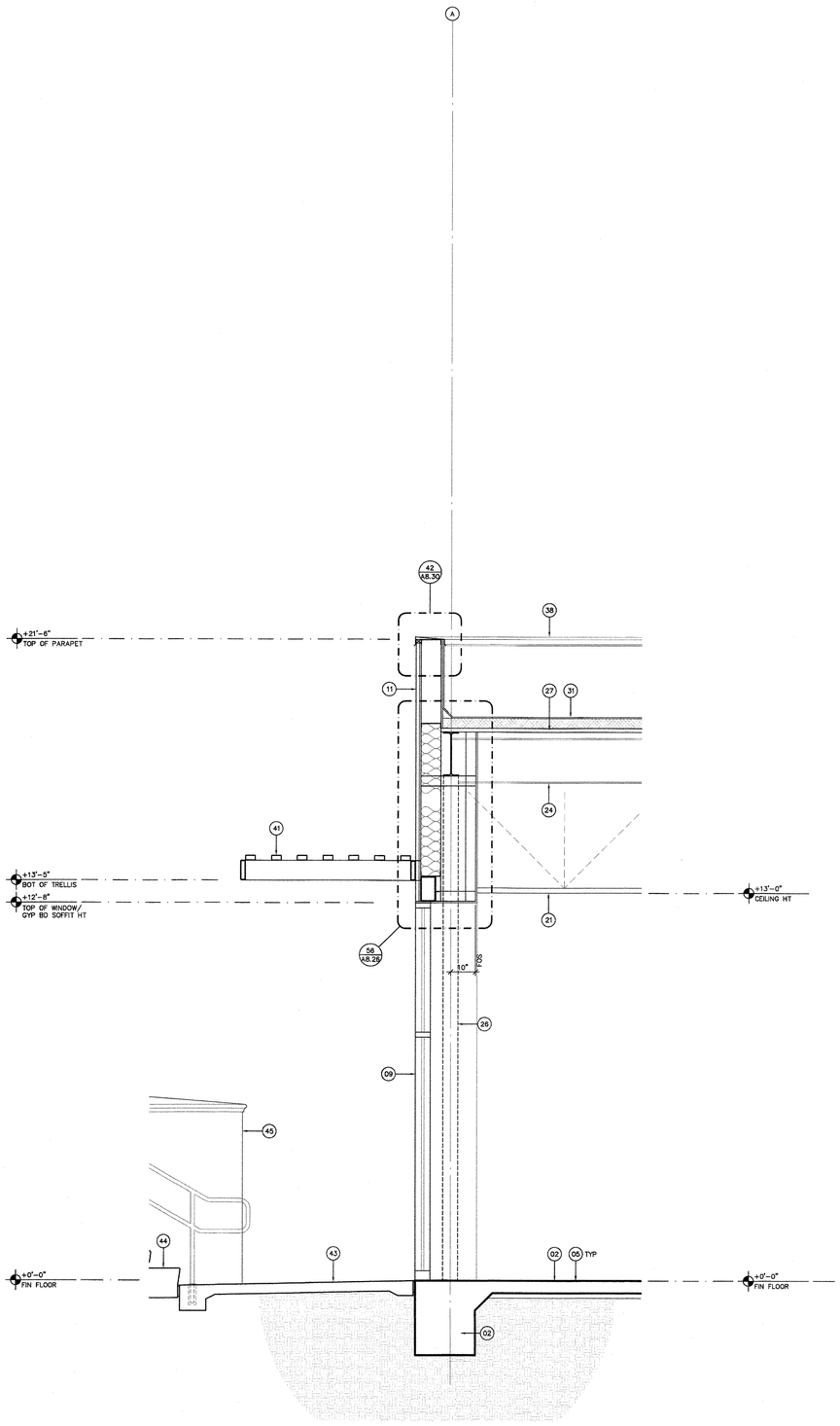
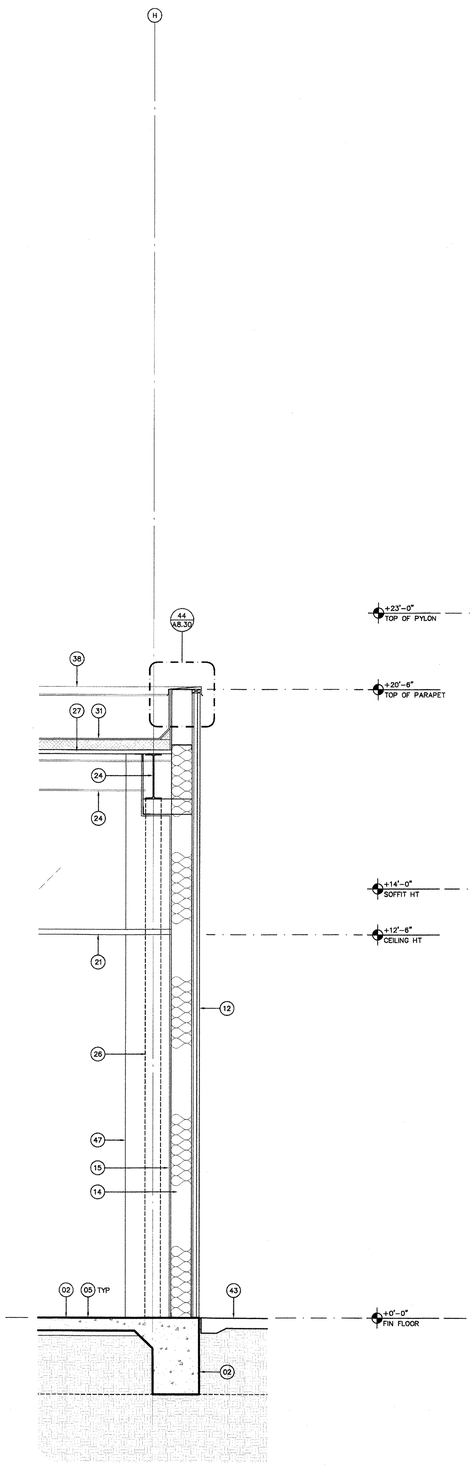
04 NOT USED
05 WALL SECTION
06 WALL SECTION

A4.21



07 Wall Section

1/2"=1'-0"



08 Wall Section

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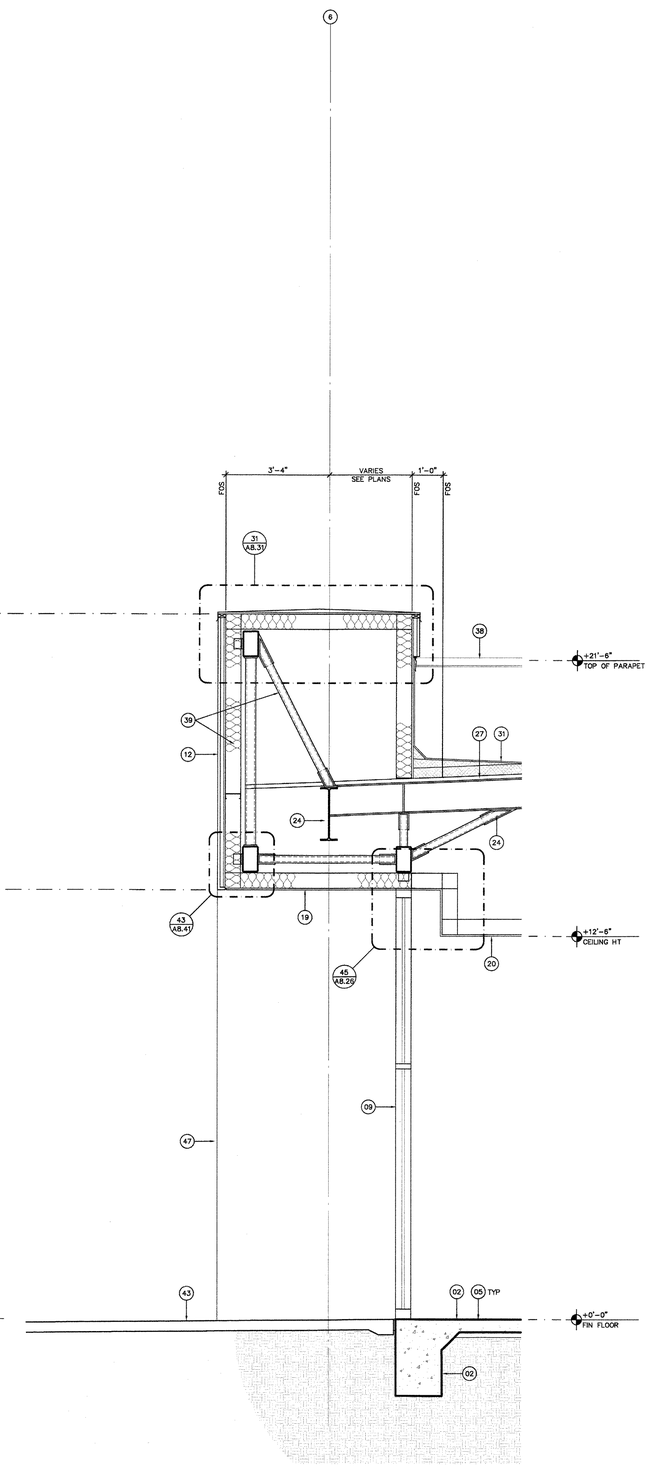

09 Wall Section

1/2"=1'-0"

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12 EXTERIOR STONE VENEER FINISH–SEE EXT ELEVS (43 A8.41)
13 EXTERIOR ALUM CLADDING–SEE EXT ELEVS (51 A8.42)
14 METAL STUD WALL–SEE FLOOR PLAN
15 INTERIOR WALL FINISH–SEE FINISH SCHEDULE/INT ELEVS
16 MAILBOX ALCOVE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
17 RECESSED DISPLAY CASE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
18 CUSTOM BUILT–IN DISPLAY CASE–SEE FLOOR PLAN/INT ELEVS; SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
19 DIRECT APPLIED FINISH SYSTEM AT SOFFIT CEILING SEE CEILING PLANS
20 GYP BD CEILING/SOFFIT–SEE CEILING PLAN SEE STRUCT SHEETS FOR FRAMING
21 SUSPENDED CEILING–SEE CEILING PLAN
22 SUSPENDED CEILING, CURVED–SEE CEILING PLAN
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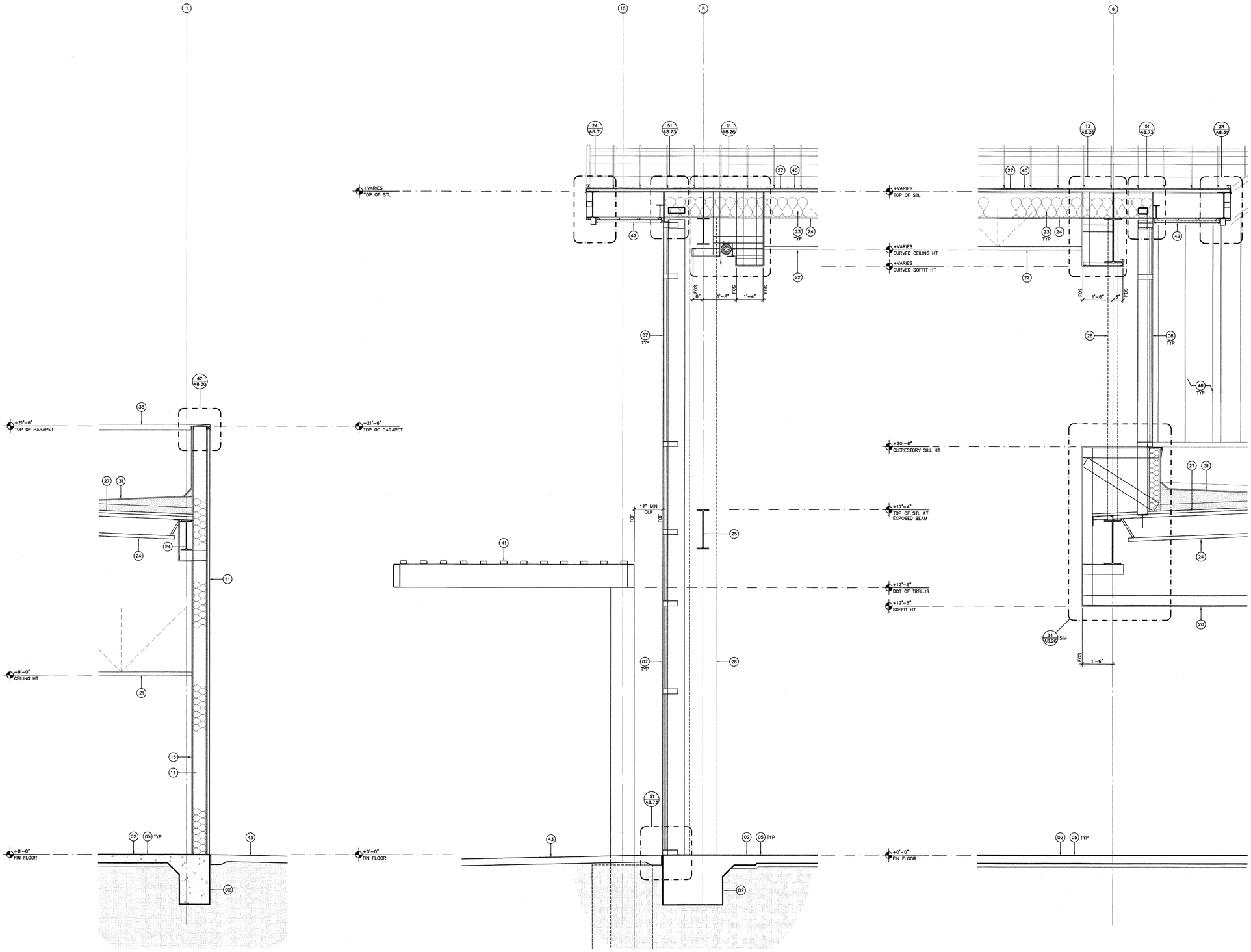
REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

07 WALL SECTION
08 WALL SECTION
09 WALL SECTION

A4.22



10 Wall Section

1/2"=1'-0"

11 Wall Section

1/2"=1'-0"

12 Wall Section

1/2"=1'-0"

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REVISIONS

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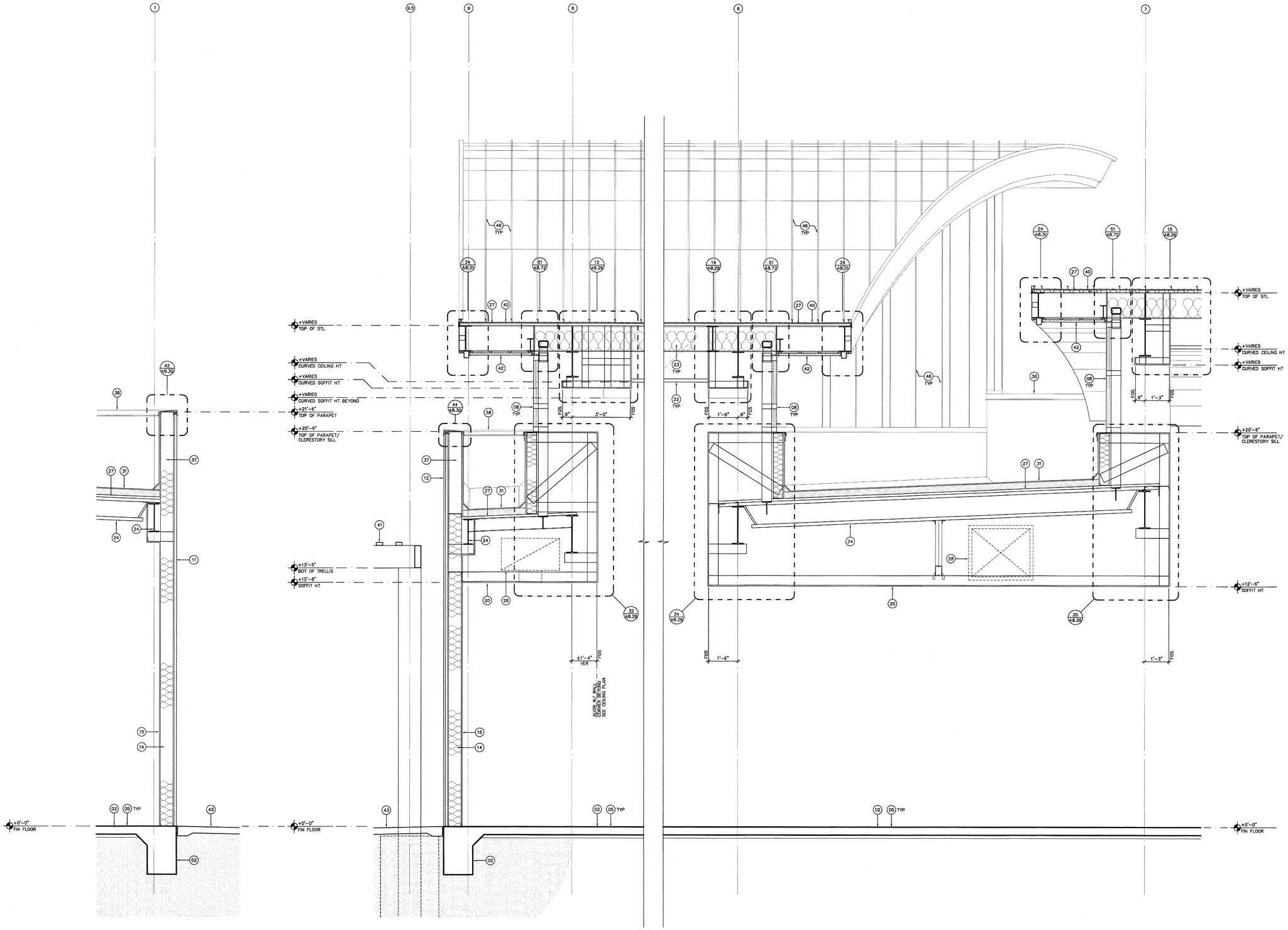
10 WALL SECTION
11 WALL SECTION
12 WALL SECTION

A4.23



13 Wall Section
1/2"=1'-0"

14 Wall Section
1/2"=1'-0"

15 Wall Section
1/2"=1'-0"

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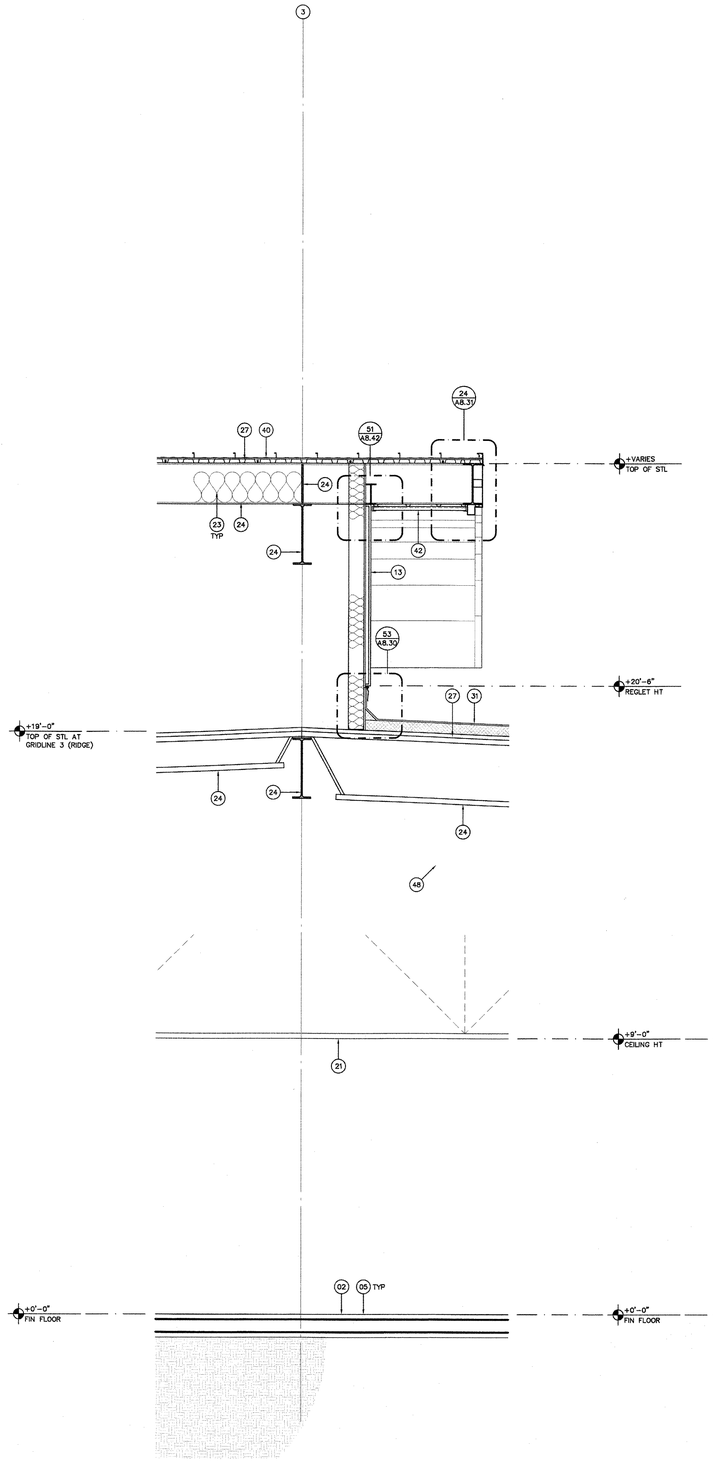
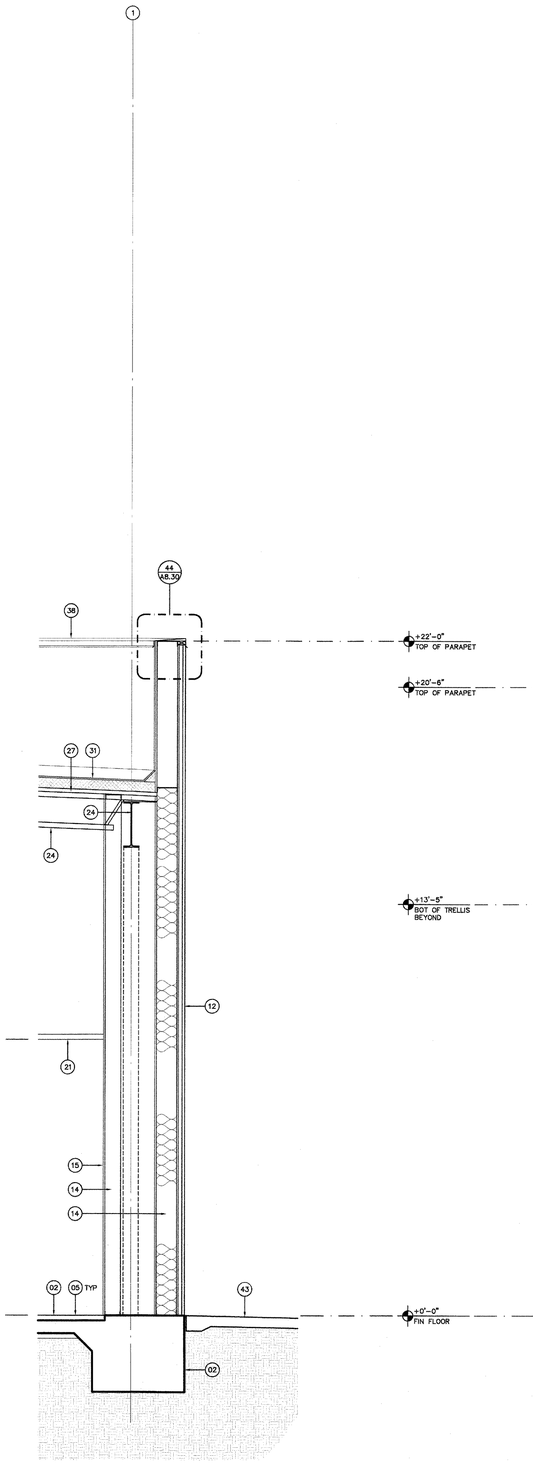
13 WALL SECTION
14 WALL SECTION
15 WALL SECTION

A4.24



16 Wall Section

1/2"=1'-0"



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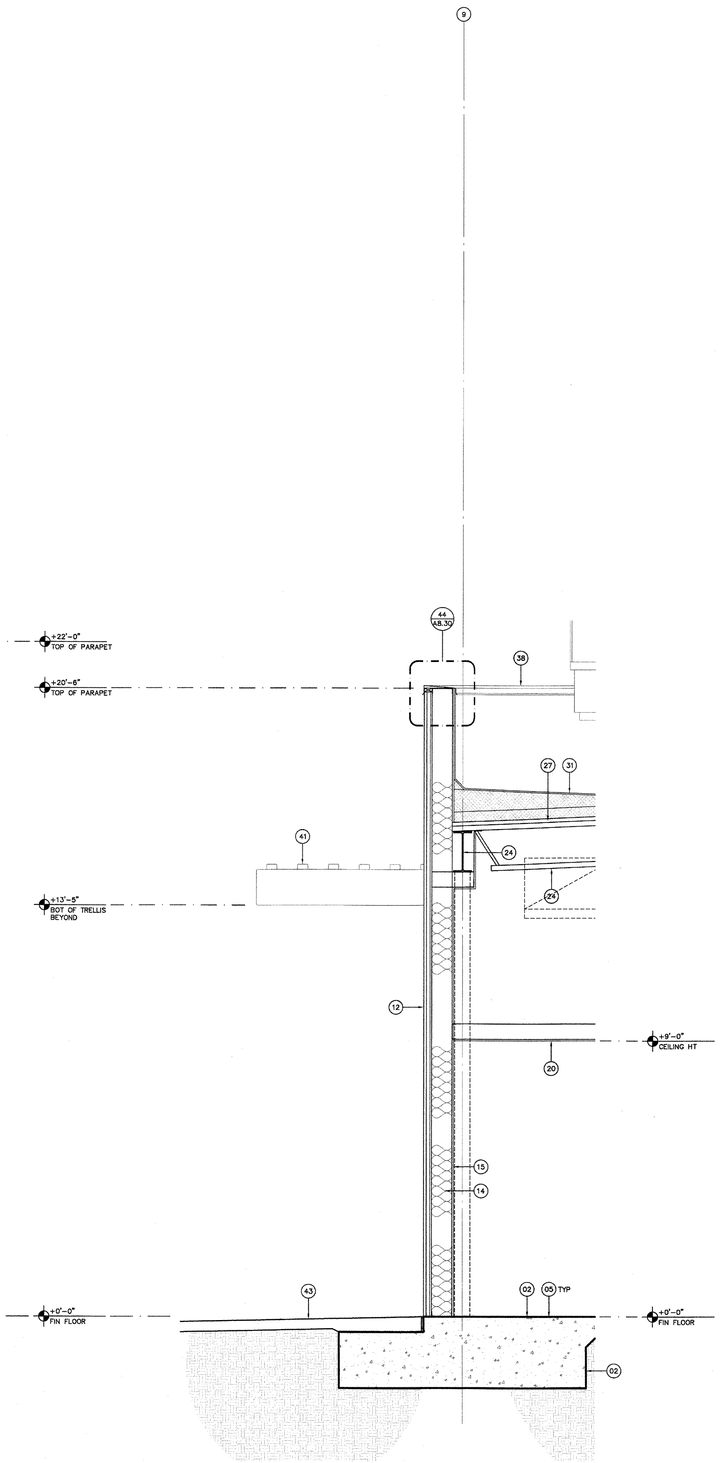
1/2"=1'-0"



18 Wall Section

1/2"=1'-0"

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07 CURTAIN WALL, FULL HT (DEFERRED APPROVAL) (51 A8.73)
08 CURTAIN WALL AT CLERESTORY (DEFERRED APPROVAL) (51 A8.73)
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10 INTERIOR STOREFRONT (23 A8.71) (24 A8.71)
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12 EXTERIOR STONE VENEER FINISH–SEE EXT ELEVS (43 A8.41)
13 EXTERIOR ALUM CLADDING–SEE EXT ELEVS (51 A8.42)
14 METAL STUD WALL–SEE FLOOR PLAN
15 INTERIOR WALL FINISH–SEE FINISH SCHEDULE/INT ELEVS
16 MAILBOX ALCOVE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
17 RECESSED DISPLAY CASE–SEE ACCESSORY PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
18 CUSTOM BUILT–IN DISPLAY CASE–SEE FLOOR PLAN/INT ELEVS SEE STRUCT SHEETS FOR FURRED–OUT WALL FRAMING
19 DIRECT APPLIED FINISH SYSTEM AT SOFFIT CEILING SEE CEILING PLANS
20 GYP BD CEILING/SOFFIT–SEE CEILING PLAN SEE STRUCT SHEETS FOR FRAMING
21 SUSPENDED CEILING–SEE CEILING PLAN
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23 R–38 BATT INSULATION–TYP AT METAL ROOF
24 STRUCTURAL STEEL MEMBERS–SEE STRUCT SHEETS
25 STRUCTURAL STEEL MEMBERS, EXPOSED–SEE STRUCT SHEETS–FINISH PER CEILING PLAN
26 STRUCTURAL MEMBERS BEYOND–SHOWN FOR REFERENCE ONLY–SEE STRUCT SHEETS
27 METAL DECK–SEE STRUCT SHEETS
28 HVAC MAIN DUCT BEYOND–SHOWN FOR REFERENCE ONLY SEE MECH SHEETS
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30 FIRE SPRINKLER MAIN PIPE–SHOWN FOR REFERENCE ONLY SEE FIRE SPRINKLER SHEETS
31 BUILT–UP ROOFING OVER 1/2" OVERLAY BOARD OVER RIGID INSULATION OVER METAL DECK–SEE ROOF PLAN
32 ROOFTOP MECH EQUIPMENT–SEE ROOF PLAN/MECH SHEETS
33 CANOPY STRUCTURE–SEE STRUCT SHEETS
34 CANOPY ROOFING–SEE ROOF PLAN
35 EQUIPMENT SCREEN–SEE STRUCT SHEETS/DETAIL (35 A8.31)
36 LINE OF EQUIPMENT SCREEN BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
37 ROOF PARAPET–SEE ROOF PLAN
38 LINE OF ROOF PARAPET BEYOND–SHOWN FOR REFERENCE ONLY–SEE ROOF PLAN
39 ROOF PYLON–SEE ROOF PLAN SEE STRUCT SHEETS FOR FRAMING
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42 PREFINISHED METAL SOFFIT (54 A8.50)
43 SITE CONC PAVING–SEE SITE PLAN
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45 MASONRY SITE WALL–SEE SITE PLAN
46 EXTERIOR ELEVATION BEYOND–SHOWN FOR REFERENCE ONLY–SEE EXTERIOR ELEVATIONS
47 LINE OF WALL/CEILING/SOFFIT BEYOND SHOWN FOR REFERENCE ONLY–SEE FLOOR/CEILING PLANS
48 SEISMIC BRACE AT CEILING HT (16 S1.09) PARTITION–SEE STRUCT SHTS
49 CEILING HT WALL CONNECTION TO GYP BD SOFFIT–SEE STRUCT SHEETS FOR FRAMING
50 GREASE INTERCEPTOR–SEE SITE/UTIL PLANS AND PLBG SHTS
51 ROOFTOP KITCHEN EQUIP–SEE ROOF PLAN/KITCHEN SHEETS (25 A8.30)

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REVISIONS

No	Date	Item
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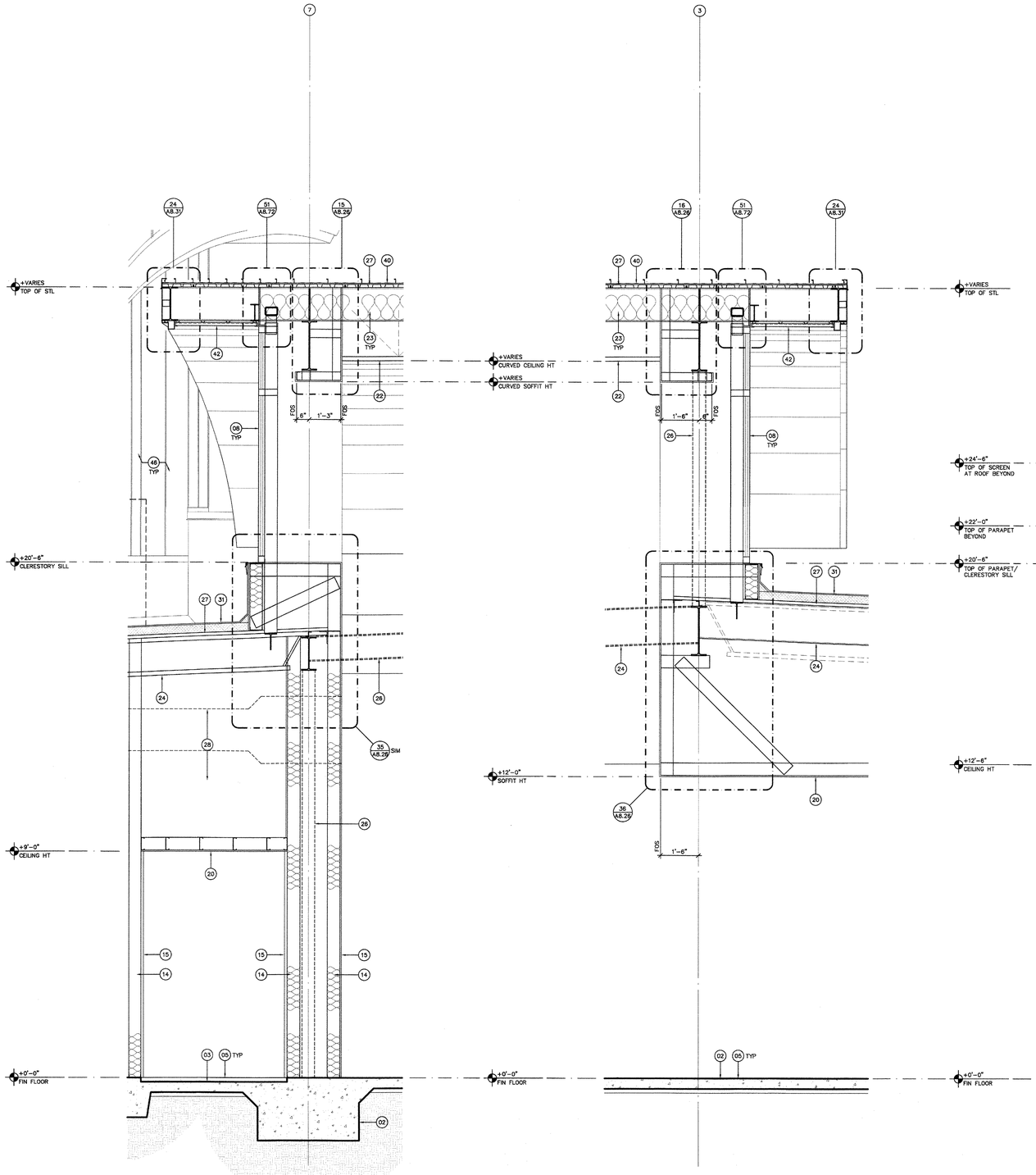
16 WALL SECTION
17 WALL SECTION
18 WALL SECTION

A4.25

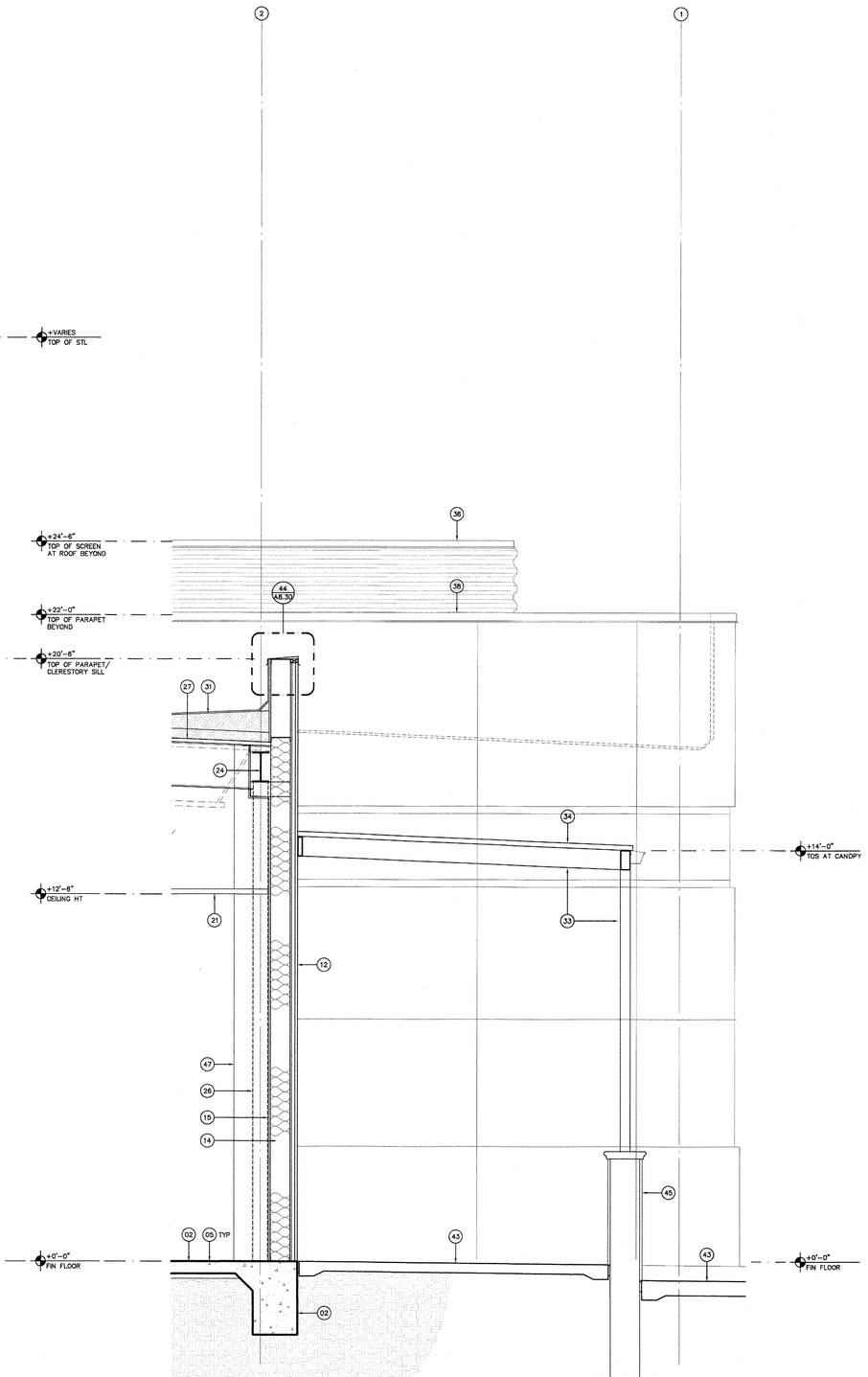


19 Wall Section

1/2"=1'-0"

20 Wall Section

1/2"=1'-0"



21 Wall Section

1/2"=1'-0"

GENERAL SECTION NOTES

SECTION KEYNOTES

01 APPROX. LINE OF OVER EXCAVATION LIMIT SEE STRUCT SHEETS AND SOILS REPORTS. (12 S1.04)
02 CONC SLAB/FOOTING–SEE STRUCT SHEETS
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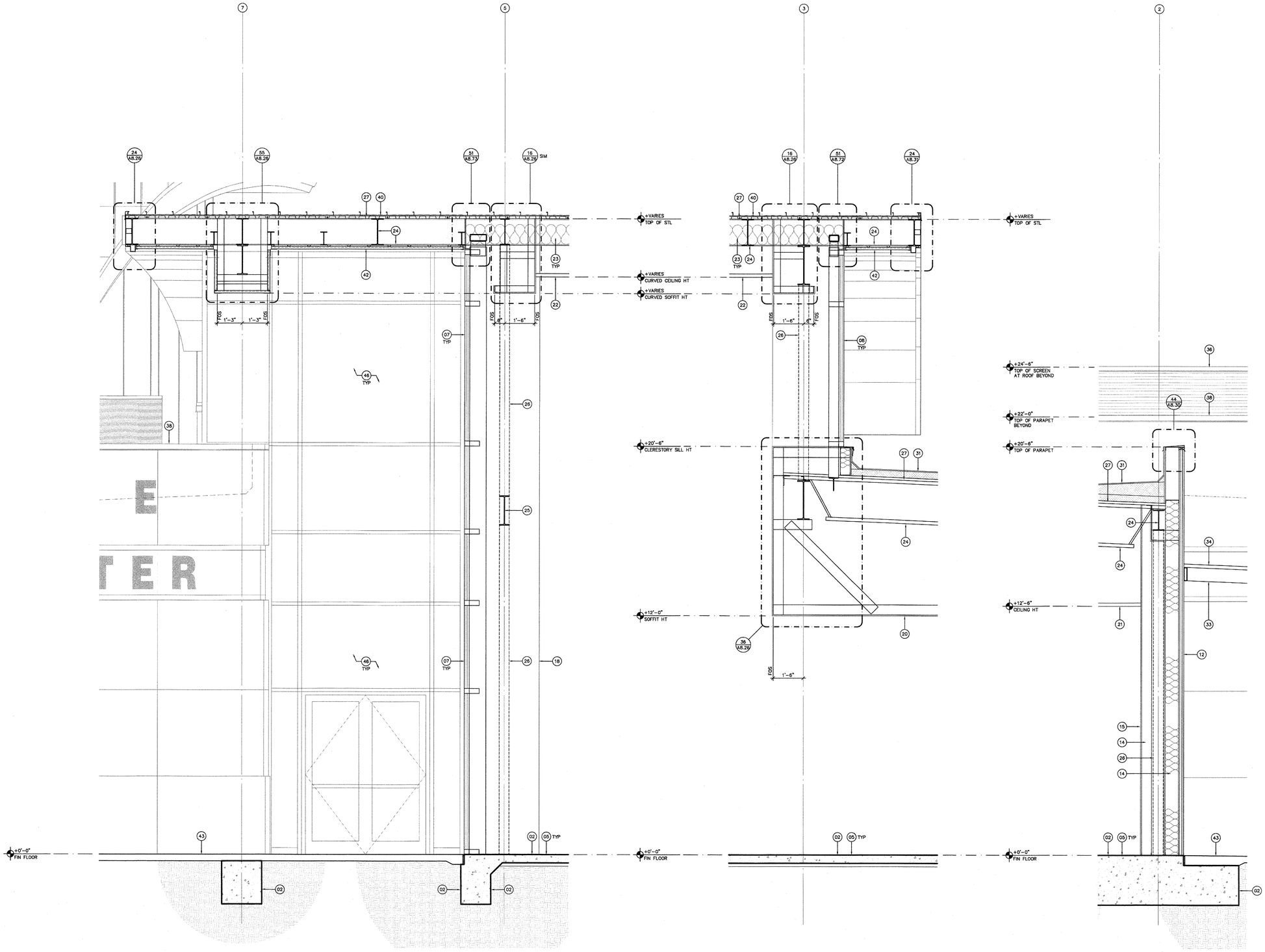
21 WALL SECTION

A4.26



22 Wall Section

1/2"=1'-0"

23 Wall Section

1/2"=1'-0"

24 Wall Section

1/2"=1'-0"

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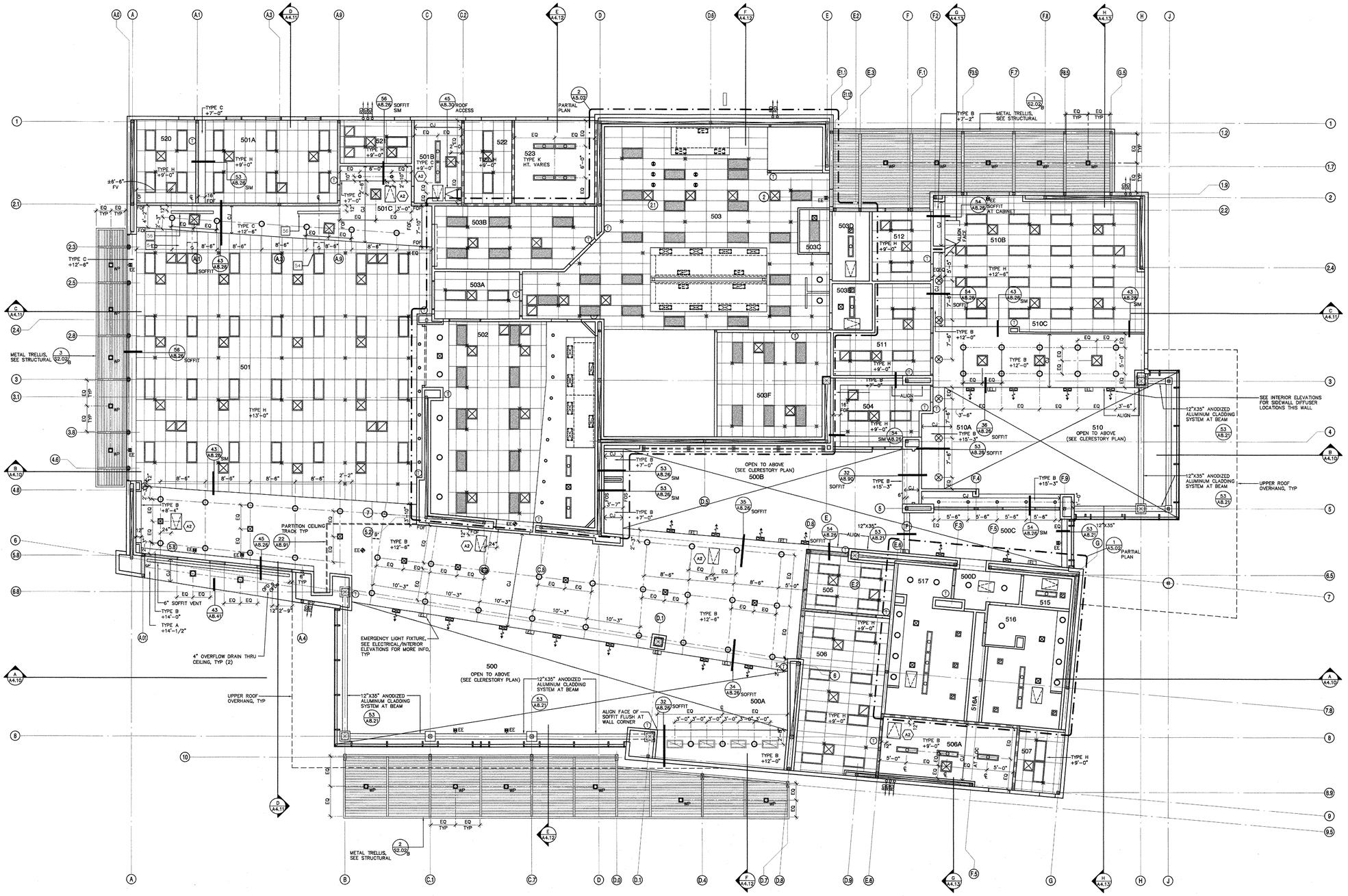
22 WALL SECTION
23 WALL SECTION
24 WALL SECTION

A4.27



Reflected Ceiling Plan

1/8"=1'-0"

FOR ADDITIONAL CEILING INFORMATION INCLUDING CLERESTORY AND HIGH CEILINGS REFER TO SHEETS A5.01 AND A5.02

NORTH

GENERAL NOTES

1. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF LIGHT FIXTURES WITH THE REFLECTED CEILING PLAN AND AT THE DIRECTION OF THE ARCHITECT.
2. THE MECHANICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL AIR-CONDITIONING GRILLES WITH LIGHT FIXTURE LAYOUTS, REFLECTED CEILING PLAN AND AT THE DIRECTION OF THE ARCHITECT.
3. REFER TO MECHANICAL DRAWINGS FOR SIZE, TYPE AND LOCATION OF ALL HVAC GRILLES, EXHAUST FANS AND OTHER MECHANICAL EQUIPMENT LOCATED IN THE CEILING.

3.1. ENVELOPE INSULATION: WALLS-SEE SECTIONS/DETAILS FOR ATTICS/CAVITIES TO BE INSULATED. WALLS SHALL HAVE THERMAL BATTS AT ALL EXTERIOR WALLS. SEE FLOOR PLAN FOR SOUND INSULATION. INTENT IS TO INSULATE ENTIRE ENVELOPE EXCEPT GLAZING/ DOORS UNO. PROVIDE ATTIC WALL INSULATION IF INSULATION IS PROVIDED AT ROOF LINE. SEE SECTION(S) FOR ADDITIONAL INFORMATION.

3.2. PROVIDE FIRE DAMPERS AT ALL MECH PENETRATIONS OF RATED CLGS AND WALLS. PROVIDE 1 HR. FIRE PROTECTION ABOVE ALL CLGS AT LIGHT FIXTURES OF RATED CLGS. METHOD SHALL BE APPROVED METHODS BY BUILDING DEPARTMENT. CONTRACTOR SHALL SUBMIT ASSEMBLY FOR REVIEW PRIOR TO BIDDING.

4. SURFACE MTD, RECESSED AND SUSPENDED LIGHT FIXTURES SHALL BE LOCATED EQUALLY BETWEEN OPPOSITE WALLS UNO.
5. HVAC REGISTERS AND GRILLES SHALL BE LOCATED EQUALLY BETWEEN OPPOSITE WALLS UNO.
6. CEILING HEIGHTS NOTED ARE TO BOTTOM OF CEILING FINISH UNO.

CEILING TYPE LEGEND

TYPE	DESCRIPTION	FIRE SPRINKLER	DTL
TYPE A	DEFS-SEE SPECIFICATIONS FOR FINISH AND TEXTURE, COLORS AS SELECTED	CONCEALED SPRINKLER	36 / A8.50
TYPE B	5/8" GYP BD-TAPE, TEXTURE AND PAINT 100% ACRYLIC ENAMEL EGGSHELL- LEVEL 4 FINISH	CONCEALED SPRINKLER	
TYPE C	5/8" GYP BD - TAPE, TEXTURE AND PAINT 100% ACRYLIC ENAMEL SEMI GLOSS - LEVEL 4 FINISH	CONCEALED SPRINKLER	
TYPE D	LINEAR METAL SUSPENDED CURVED CEILING SYSTEM	CONCEALED SPRINKLER	44 / A8.50
TYPE E	NOT USED		
TYPE F	24x48 CEILING GRID WITH LAY IN TILES. ARMSTRONG ULTIMA HEALTH ZONE TILES WITH CLEAN ROOM GRID	CONCEALED SPRINKLER	31 / A8.50
TYPE G	NOT USED		
TYPE H	24x48 CEILING GRID W/ TEGULAR ACOUS PANELS, ARMSTRONG DUNE TEGULAR WITH INTERLUDE XL GRID	CONCEALED SPRINKLER	31 / A8.50
TYPE J	METAL SOFFIT PANELS- EXTERIOR		54 / A8.50
TYPE K	EXPOSED METAL DECK, PAINT DECK/BEAMS/ALL EXPOSED SURFACES AND APPURTENANCES		

CEILING SYMBOL LEGEND

	24X48 ACOUSTICAL CEILING TILE
℄ EA WAY	24X48 SUSPENDED FLUORESCENT LIGHT FIXTURE, SEE ELEC SHEETS.
℄ EA WAY	24X48 SUSPENDED FLUORESCENT LIGHT FIXTURE WITH SOLID LENS COVER, SEE ELEC SHEETS.
℄ EA WAY	24x48 SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE, SEE ELECTRICAL SHEETS
℄ EA WAY	SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE, SEE ELECTRICAL SHEETS
WP ℄ EA WAY	RECESSED/EXPOSED LIGHT FIXTURE AT EXTERIOR, SEE ELECTRICAL SHEETS. WEATHERPROOF
℄ EA WAY	RECESSED LIGHT FIXTURE, SEE ELECTRICAL SHEETS
	WALL MOUNTED LIGHT FIXTURE, SEE ELECTRICAL SHEETS/ELEVATIONS
	SUSPENDED LIGHT FIXTURE, SEE ELECTRICAL SHEETS (56 / A8.50)
DC	DROP CORD LOCATION, SEE KITCHEN/ELECTRICAL SHEETS FOR COORDINATION
	SUPPLY AIR GRILLE/REGISTER/DIFFUSER. SEE MECHANICAL SHEETS
	RETURN AIR GRILLE. SEE MECHANICAL SHEETS
	EXHAUST AIR GRILLE. SEE MECHANICAL SHEETS
	SIDEWALL DIFFUSER, SEE MECHANICAL SHEETS/INTERIOR ELEVATIONS FOR LOCATION
	BRACING AND COMPRESSION STRUT LOCATION (MINIMUM LOCATIONS) (31A / A8.50)
EE	EMERGENCY EXIT FIXTURE, SEE ELECTRICAL SHEETS
EE	EMERGENCY LIGHT FIXTURE, SEE ELECTRICAL SHEETS
	FULL HEIGHT WALL, NON-RATED
	FULL HEIGHT WALL, RATED
#	CEILING ACCESSORY, SEE SHEET A2.00
#	CEILING ACCESS DOOR, SEE A2.00 (51 / A8.50)
OFD/SD	OFD 4" OVERFLOW DRAIN, SEE PLANS (41 / A8.30)
	6" SOFFIT VENT AT DIRECT APPLIED FINISH SYSTEM (36 / A8.50)

TYPICAL DETAILS

31 / A8.50	WIRE SUSPENSION SYSTEM	31C / A8.50	FREE END OF SUSPENDED CLG	31 / A8.50	TYP SUSPENDED CLG LAYOUT
31 / A8.50	SUSPENDED ACOUSTIC CLG	31B / A8.50	FIXED END OF SUSPENDED CLG		
		56 / A8.50	SUSPENDED LIGHT BRACING		

METAL CEILING JOISTS

THE DIRECTION OF SPAN FOR CLG JSTS ARE AS INDICATED:

CJ

SEE STRUCTURAL SHEET FOR TYPICAL DETAILS AND SIZES

(– / S2.00)

17-03-01

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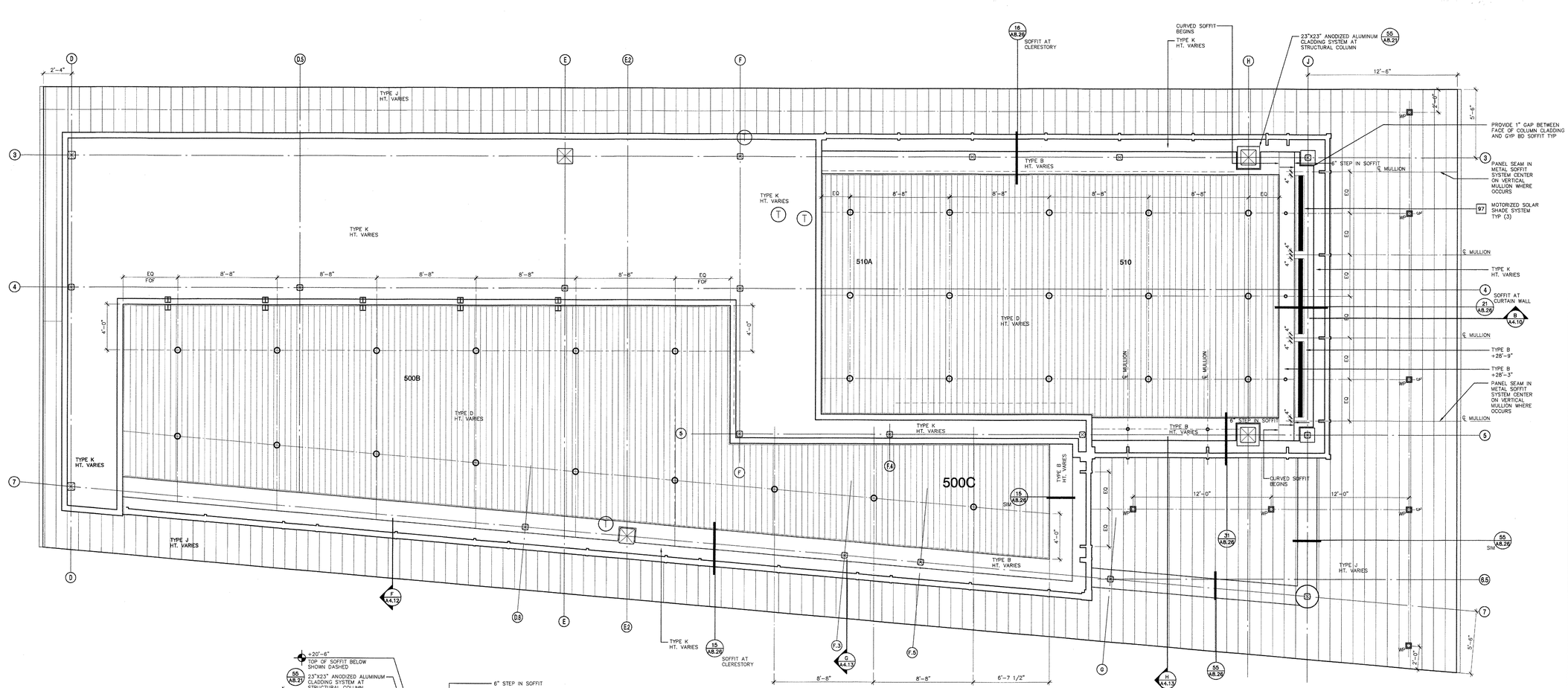
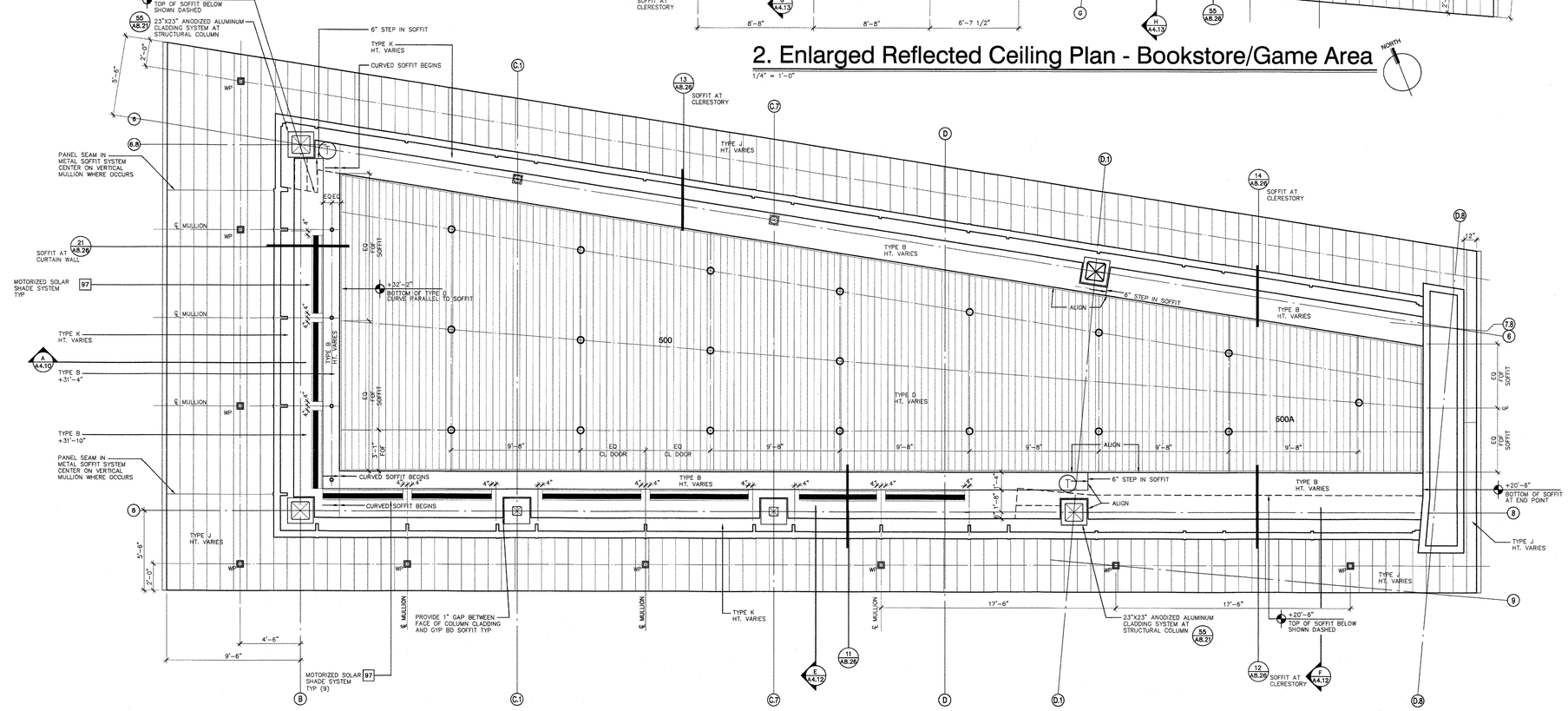
REFLECTED CEILING PLAN

A5.00



2. Enlarged Reflected Ceiling Plan - Bookstore/Game Area

1/4" = 1'-0"



1. Enlarged Reflected Ceiling Plan - Student Commons

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6. CEILING HEIGHTS NOTED ARE TO BOTTOM OF CEILING FINISH UNO.

CEILING TYPE LEGEND

TYPE	DESCRIPTION	FIRE SPRINKLER	DTL
TYPE A	DEFS-SEE SPECIFICATIONS FOR FINISH AND TEXTURE, COLORS AS SELECTED	CONCEALED SPRINKLER	36 / A8.50
TYPE B	5/8" GYP BD-TAPE, TEXTURE AND PAINT 100% ACRYLIC ENAMEL EGGSHELL- LEVEL 4 FINISH	CONCEALED SPRINKLER	
TYPE C	5/8" GYP BD – TAPE, TEXTURE AND PAINT 100% ACRYLIC ENAMEL SEMI GLOSS – LEVEL 4 FINISH	CONCEALED SPRINKLER	
TYPE D	LINEAR METAL SUSPENDED CURVED CEILING SYSTEM	CONCEALED SPRINKLER	44 / A8.50
TYPE E	NOT USED		
TYPE F	24x48 CEILING GRID WITH LAY-IN TILES. ARMSTRONG ULTIMA HEALTH ZONE TILES WITH CLEAN ROOM GRID	CONCEALED SPRINKLER	31 / A8.50
TYPE G	NOT USED		
TYPE H	24x48 CEILING GRID W/ TEGULAR ACOUS PANELS, ARMSTRONG DUNE TEGULAR WITH INTERLUDE XL GRID	CONCEALED SPRINKLER	31 / A8.50
TYPE J	METAL SOFFIT PANELS- EXTERIOR		54 / A8.50
TYPE K	EXPOSED METAL DECK, PAINT DECK/BEAMS/ALL EXPOSED SURFACES AND APPURTENANCES		

CEILING SYMBOL LEGEND

	24X48 ACOUSTICAL CEILING TILE
℄ EA WAY	24X48 SUSPENDED FLUORESCENT LIGHT FIXTURE, SEE ELEC SHEETS.
℄ EA WAY	24X48 SUSPENDED FLUORESCENT LIGHT FIXTURE WITH SOLID LENS COVER, SEE ELEC SHEETS.
℄ EA WAY	24x48 SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE, SEE ELECTRICAL SHEETS
℄ EA WAY	SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE, SEE ELECTRICAL SHEETS
WP ℄ EA WAY	RECESSED/EXPOSED LIGHT FIXTURE AT EXTERIOR, SEE ELECTRICAL SHEETS. WEATHERPROOF
℄ EA WAY	RECESSED LIGHT FIXTURE, SEE ELECTRICAL SHEETS
	WALL MOUNTED LIGHT FIXTURE, SEE ELECTRICAL SHEETS/ELEVATIONS
	SUSPENDED LIGHT FIXTURE, SEE ELECTRICAL SHEETS (56 / A8.50)
DC	DROP CORD LOCATION, SEE KITCHEN/ELECTRICAL SHEETS FOR COORDINATION
	SUPPLY AIR GRILLE/REGISTER/DIFFUSER, SEE MECHANICAL SHEETS
	RETURN AIR GRILLE, SEE MECHANICAL SHEETS
	EXHAUST AIR GRILLE, SEE MECHANICAL SHEETS
SD	SIDEWALL DIFFUSER, SEE MECHANICAL SHEETS/INTERIOR ELEVATIONS FOR LOCATION
	BRACING AND COMPRESSION STRUT LOCATION (MINIMUM LOCATIONS) (31A / A8.50)
EE	EMERGENCY EXIT FIXTURE, SEE ELECTRICAL SHEETS
	EMERGENCY LIGHT FIXTURE, SEE ELECTRICAL SHEETS
	FULL HEIGHT WALL, NON-RATED
	FULL HEIGHT WALL, RATED
#	CEILING ACCESSORY, SEE SHEET A2.00
#	CEILING ACCESS DOOR, SEE A2.00 (51 / A8.50)
OFD	OFD 4" OVERFLOW DRAIN, SEE PLANS (41 / A8.30)
	6" SOFFIT VENT AT DIRECT APPLIED FINISH SYSTEM (36 / A8.50)

TYPICAL DETAILS

31 / A8.50	WIRE SUSPENSION SYSTEM	31C / A8.50	FREE END OF SUSPENDED CLG	21 / A8.50	TYP SUSPENDED CLG LAYOUT
31 / A8.50	SUSPENDED ACOUSTIC CLG	31B / A8.50	FIXED END OF SUSPENDED CLG		
		56 / A8.50	SUSPENDED LIGHT BRACING		

METAL CEILING JOISTS

THE DIRECTION OF SPAN FOR CLG JSTS ARE AS INDICATED:

CJ

SEE STRUCTURAL SHEET FOR TYPICAL DETAILS AND SIZES

17-03-01

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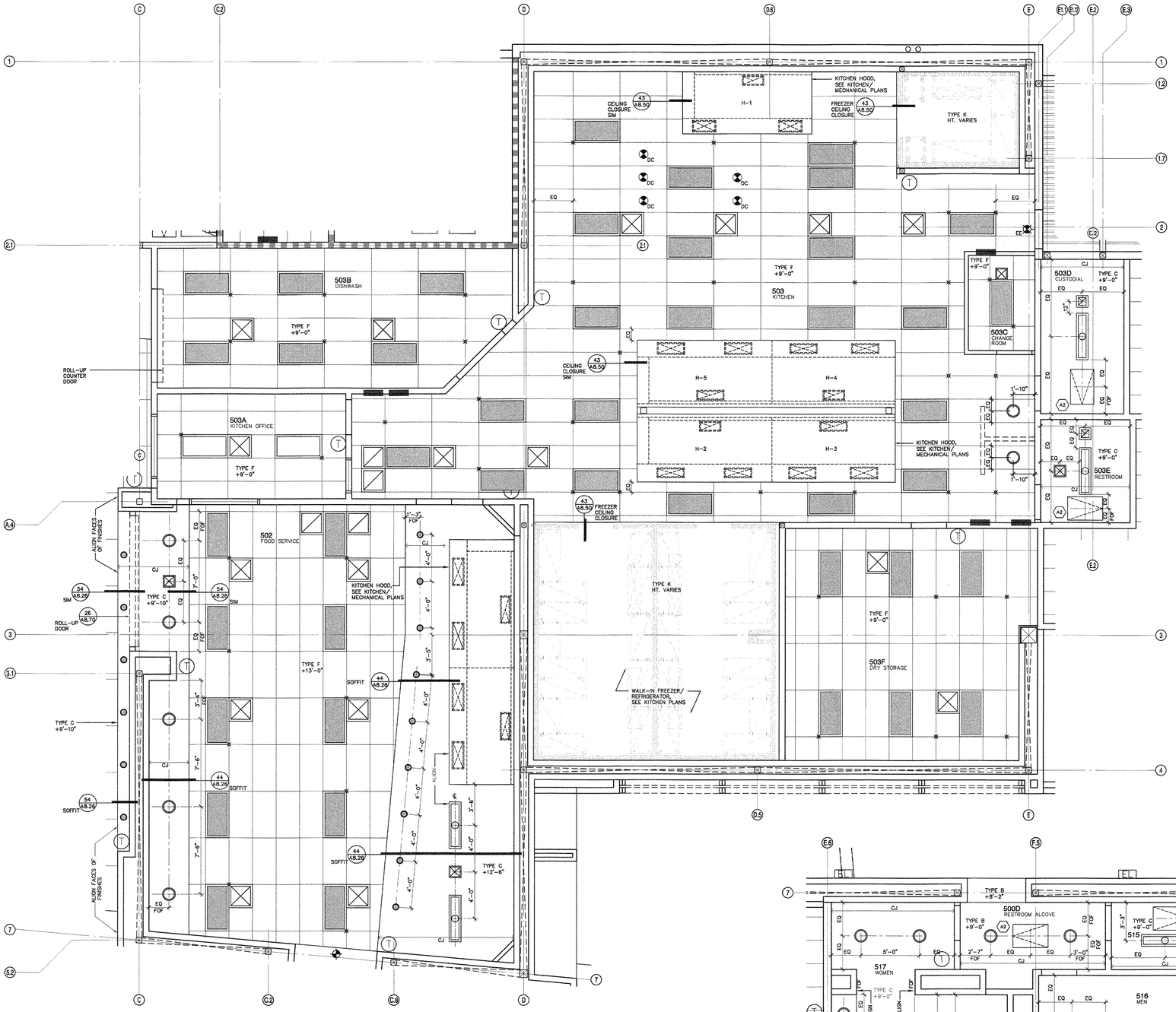
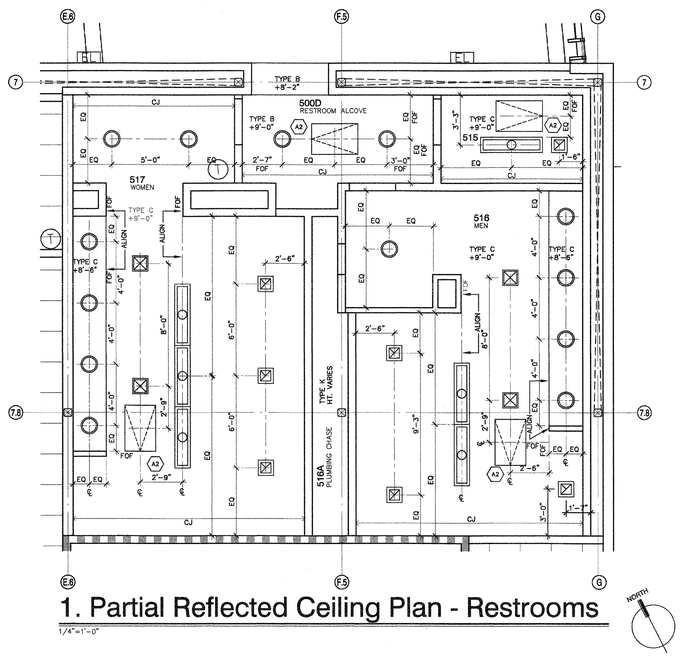
CLERESTORY REFLECTED CEILING PLAN

A5.01



2. Partial Reflected Ceiling Plan - Kitchen

1/4"=1'-0"



1. Partial Reflected Ceiling Plan - Restrooms

1/4"=1'-0"

GENERAL NOTES

1. THE ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF LIGHT FIXTURES WITH THE REFLECTED CEILING PLAN AND AT THE DIRECTION OF THE ARCHITECT.
2. THE MECHANICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL AIR-CONDITIONING GRILLES WITH LIGHT FIXTURE LAYOUTS, REFLECTED CEILING PLAN AND AT THE DIRECTION OF THE ARCHITECT.
3. REFER TO MECHANICAL DRAWINGS FOR SIZE, TYPE AND LOCATION OF ALL HVAC GRILLES, EXHAUST FANS AND OTHER MECHANICAL EQUIPMENT LOCATED IN THE CEILING.

3.1. ENVELOPE INSULATION: WALLS-SEE SECTIONS/DETAILS FOR ATTICS/CAVITIES TO BE INSULATED. WALLS SHALL HAVE THERMAL BATTS AT ALL EXTERIOR WALLS. SEE FLOOR PLAN FOR SOUND INSULATION. INTENT IS TO INSULATE ENTIRE ENVELOPE EXCEPT GLAZING/ DOORS UNO. PROVIDE ATTIC WALL INSULATION IF INSULATION IS PROVIDED AT ROOF LINE. SEE SECTION(S) FOR ADDITIONAL INFORMATION.

3.2. PROVIDE FIRE DAMPERS AT ALL MECH PENETRATIONS OF RATED CLGS AND WALLS. PROVIDE 1 HR. FIRE PROTECTION ABOVE ALL CLGS AT LIGHT FIXTURES OF RATED CLGS. METHOD SHALL BE APPROVED METHODS BY BUILDING DEPARTMENT. CONTRACTOR SHALL SUBMIT ASSEMBLY FOR REVIEW PRIOR TO BIDDING.

4. SURFACE MTD, RECESSED AND SUSPENDED LIGHT FIXTURES SHALL BE LOCATED EQUALLY BETWEEN OPPOSITE WALLS UNO.
5. HVAC REGISTERS AND GRILLES SHALL BE LOCATED EQUALLY BETWEEN OPPOSITE WALLS UNO.
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	RETURN AIR GRILLE. SEE MECHANICAL SHEETS
	EXHAUST AIR GRILLE. SEE MECHANICAL SHEETS
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	FULL HEIGHT WALL, RATED
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TYPICAL DETAILS

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31 / A8.50 SUSPENDED ACOUSTIC CLG	31B / A8.50 FIXED END OF SUSPENDED CLG		
	56 / A8.50 SUSPENDED LIGHT BRACING		

METAL CEILING JOISTS

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SEE STRUCTURAL SHEET FOR TYPICAL DETAILS AND SIZES

(-02.00)

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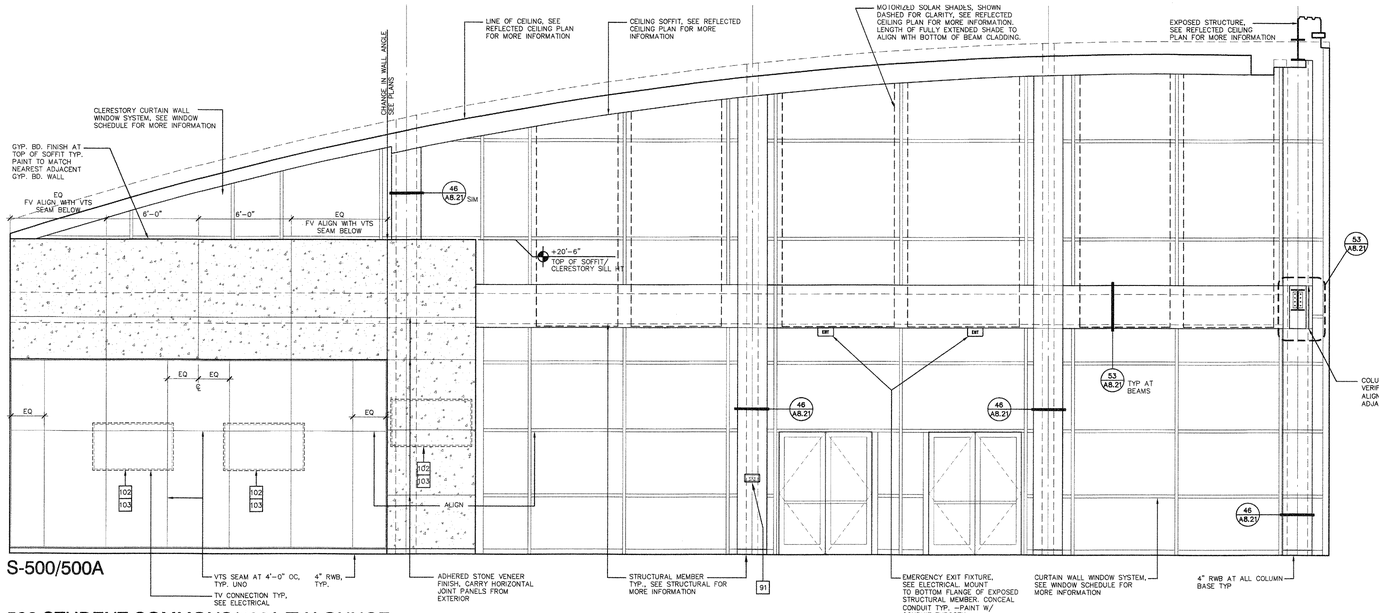
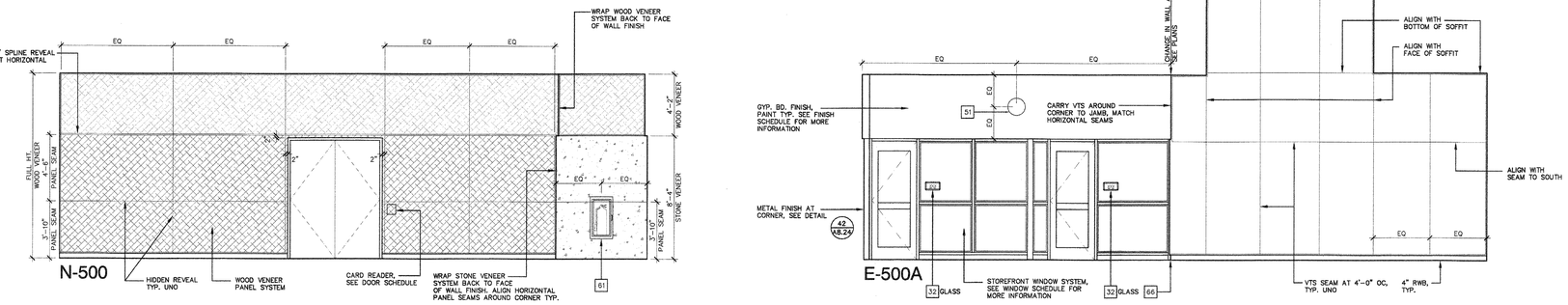
DIMENSIONED PARTIAL REFLECTED CEILING PLANS

A5.02



500 STUDENT COMMONS/500A TV LOUNGE

1/4"=1'-0"



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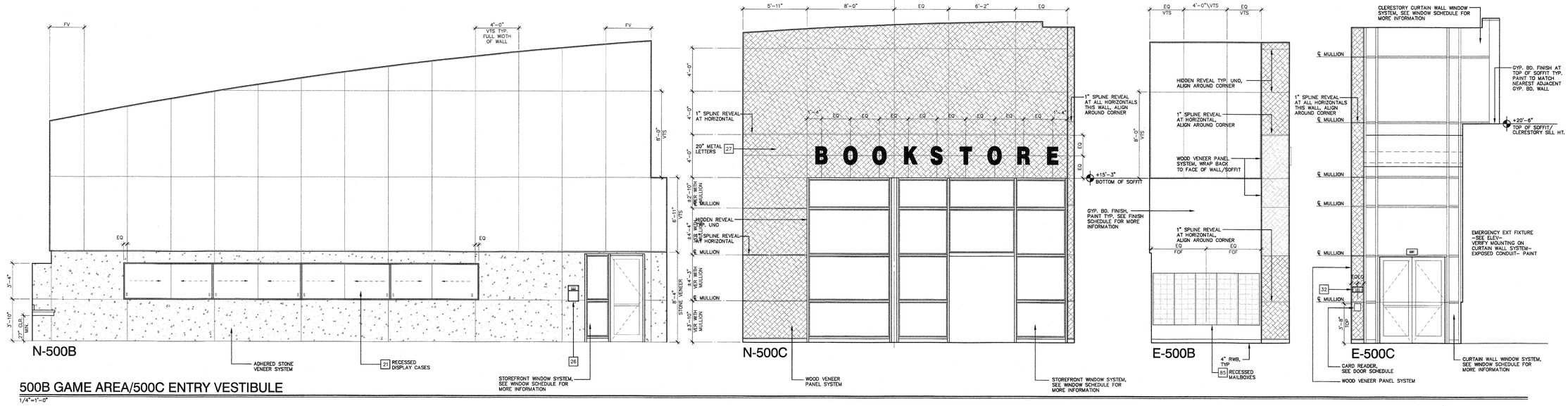

500B GAME AREA/500C ENTRY VESTIBULE

1/4"=1'-0"

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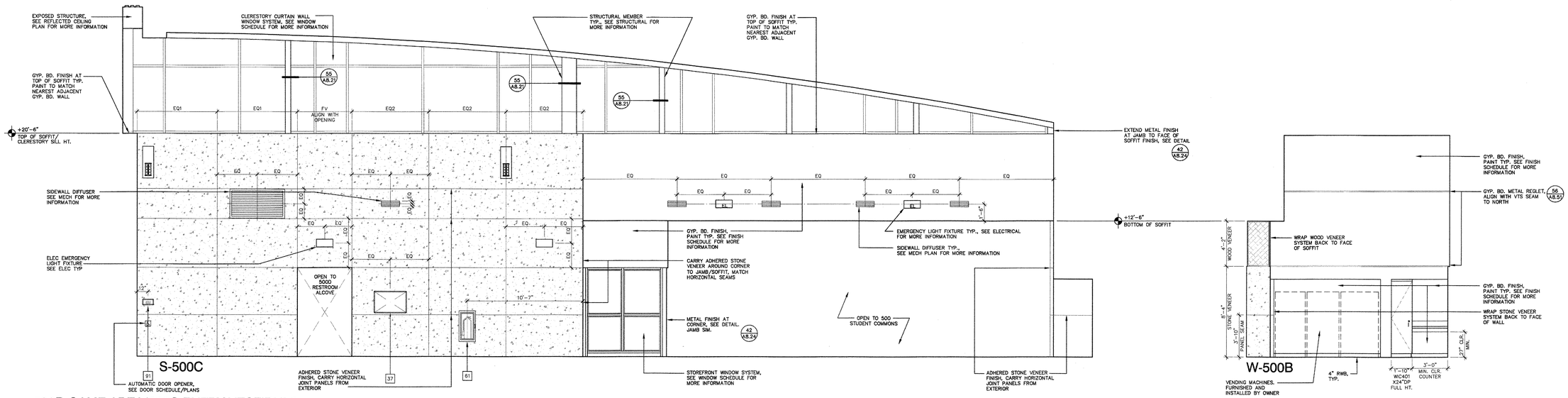
INTERIOR ELEVATIONS

A6.00



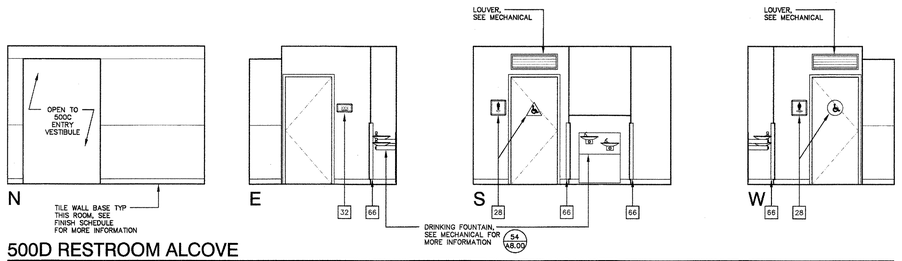
500B GAME AREA/500C ENTRY VESTIBULE

1/4"=1'-0"

WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

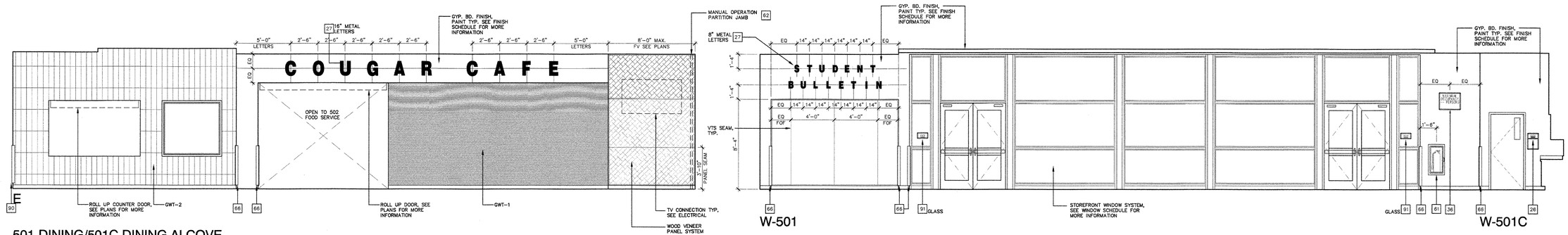
PLASTIC LAMINATE COUNTER/ SPLASH/RETURN

TYP CABINET INSTALLATION (21/A8.65)



500D RESTROOM ALCOVE

1/4"=1'-0"

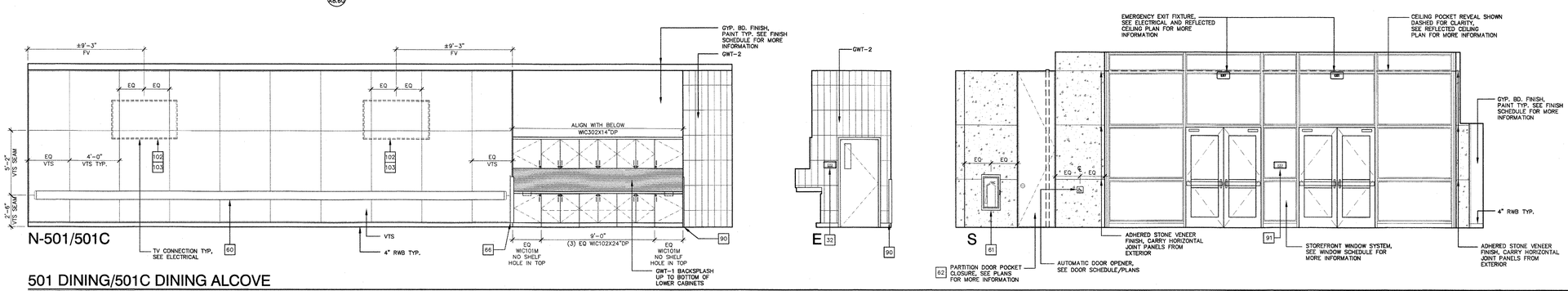


501 DINING/501C DINING ALCOVE

1/4"=1'-0"

WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

TYP CABINET INSTALLATION (21/A8.65)



501 DINING/501C DINING ALCOVE

1/4"=1'-0"

WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

SOLID POLYMER COUNTER/ SPLASH/RETURN

TYP CABINET INSTALLATION (21/A8.65)

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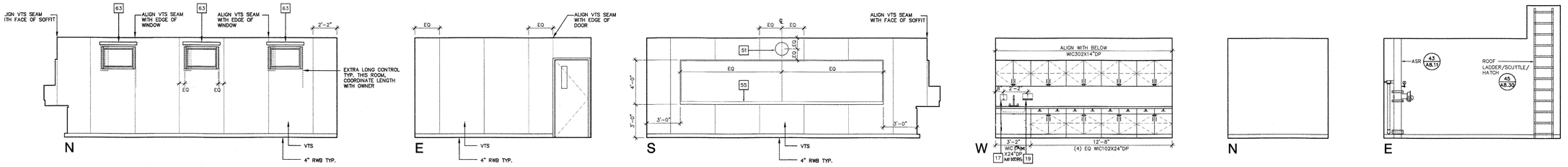
INTERIOR ELEVATIONS

A6.01



501A STAFF DINING

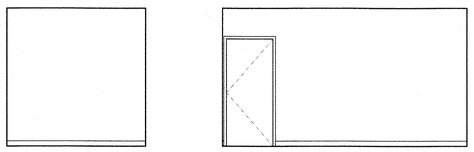
1/4"=1'-0"

WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

PLASTIC LAMINATE COUNTER/ SPLASH/RETURN

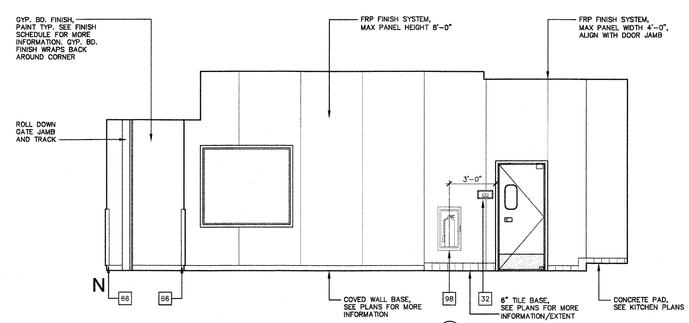
TYP CABINET INSTALLATION (21 / A8.60)

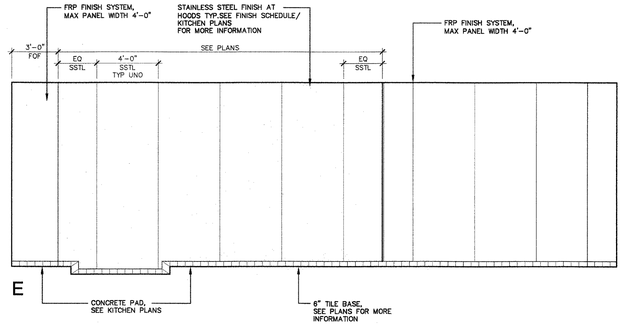
TYP ACCESSIBLE SINK AT CABINET (36 / A8.00)

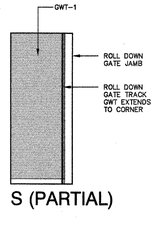


501B DINING STORAGE

1/4"=1'-0"







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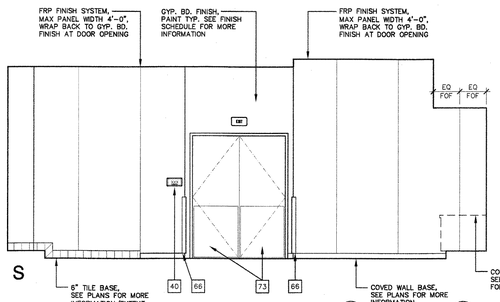


502 FOOD SERVICE

1/4"=1'-0"

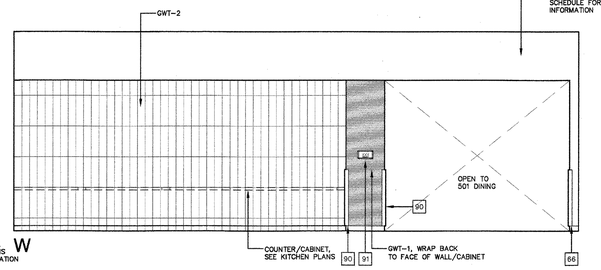
KITCHEN EQUIPMENT NOT SHOWN FOR CLARITY, SEE KITCHEN SHEETS

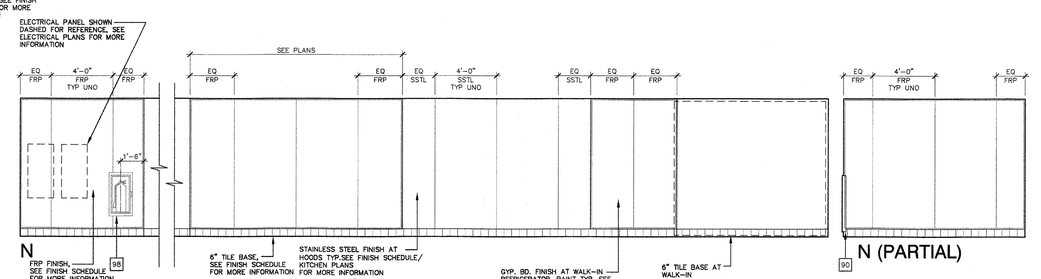
KITCHEN EQUIPMENT BACKING TYP (9 / S1.05)

TYP CABINET INSTALLATION (21 / A8.60)

WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

PROVIDE BACKING IN WALL FOR SURFACE MOUNTED KITCHEN EQUIPMENT ITEM. FIELD VERIFY BACKING REQUIRED WITH KITCHEN EQUIPMENT CONSULTANT PRIOR TO CLOSING UP WALL/INSTALLING ANY FINISH. ITEMS SHOWN ARE DIAGRAMMATIC AND SHALL BE VERIFIED FOR LOCATION, HEIGHT, QUANTITY AND SPACING.





503 KITCHEN

1/4"=1'-0"

KITCHEN EQUIPMENT NOT SHOWN FOR CLARITY, SEE KITCHEN SHEETS

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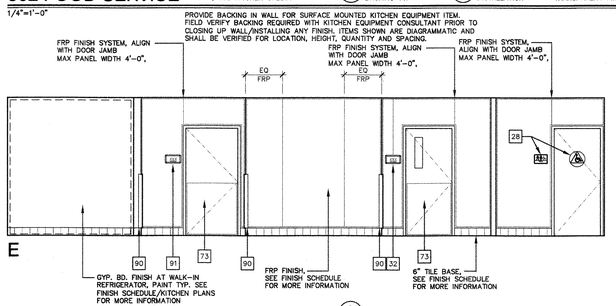

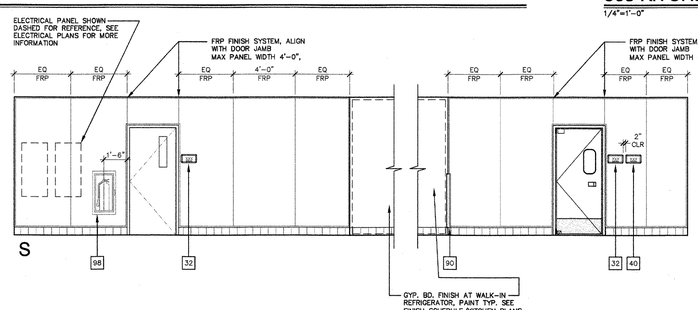

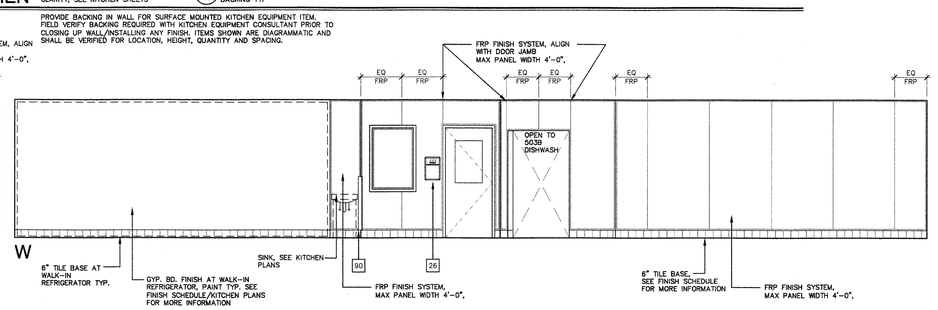

503 KITCHEN

1/4"=1'-0"

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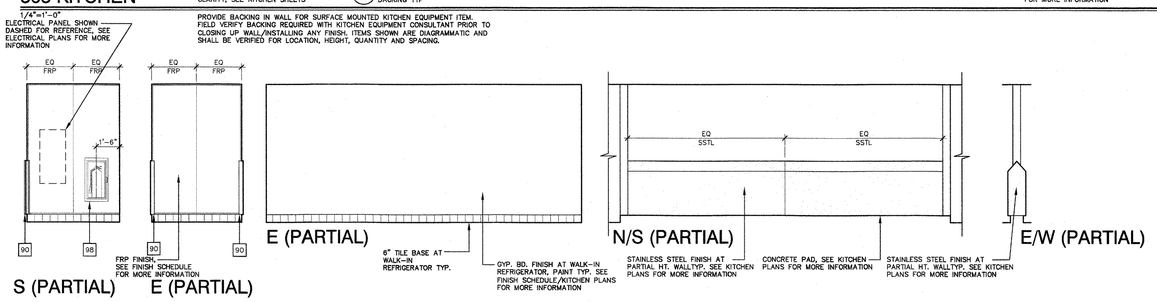

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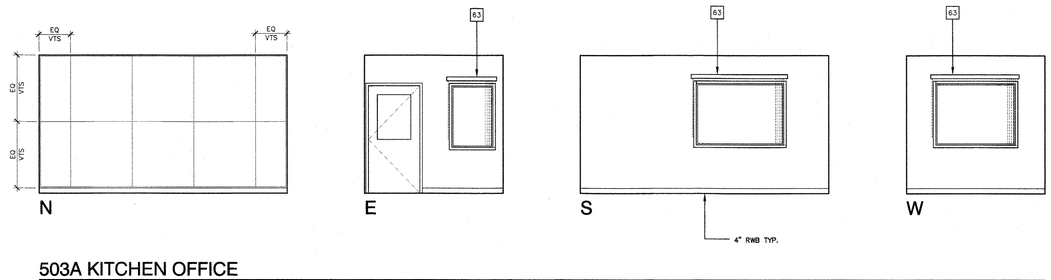

503A KITCHEN OFFICE

1/4"=1'-0"

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ARCHITECT

LICENSED ARCHITECT KEVIN COBB 26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
AC FLS SS
DATE SEP 16 2015

PROJECT INFO

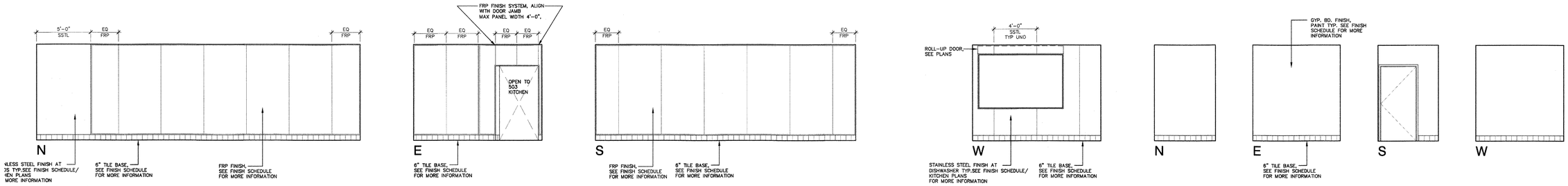
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

INTERIOR ELEVATIONS

A6.02

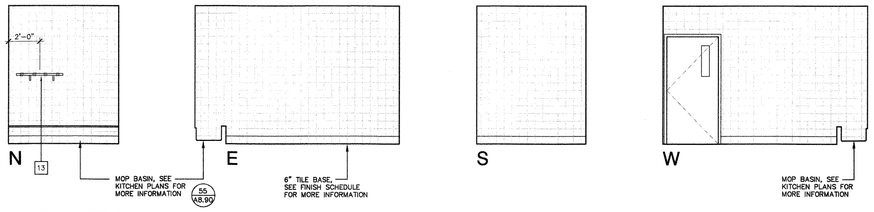


503B DISHWASH

1/4"=1'-0"

FOR EQUIPMENT/BACKING LOCATIONS SEE KITCHEN PLANS (53 A8.20)

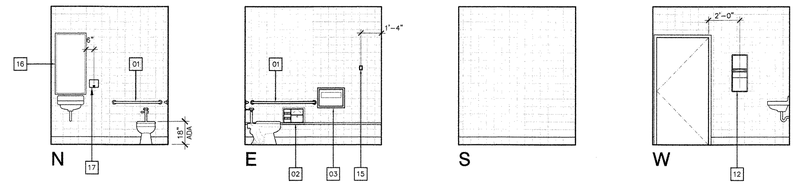
PROVIDE BACKING IN WALL FOR SURFACE MOUNTED KITCHEN EQUIPMENT ITEM. FIELD VERIFY BACKING REQUIRED WITH KITCHEN EQUIPMENT CONSULTANT PRIOR TO CLOSING UP WALL/INSTALLING ANY FINISH. ITEMS SHOWN ARE DIAGRAMMATIC AND SHALL BE VERIFIED FOR LOCATION, HEIGHT, QUANTITY AND SPACING.



503C CHANGE ROOM

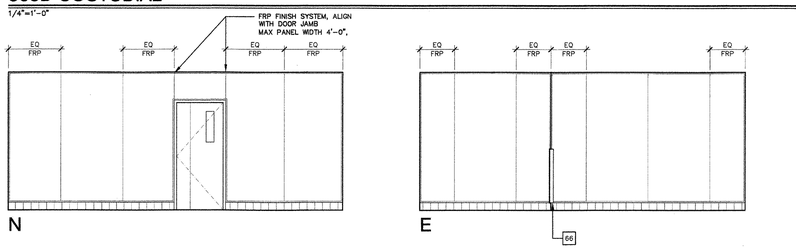
1/4"=1'-0"

PROVIDE BACKING IN WALL FOR SURFACE MOUNTED KITCHEN EQUIPMENT ITEM. FIELD VERIFY BACKING REQUIRED WITH KITCHEN EQUIPMENT CONSULTANT PRIOR TO CLOSING UP WALL/INSTALLING ANY FINISH. ITEMS SHOWN ARE DIAGRAMMATIC AND SHALL BE VERIFIED FOR LOCATION, HEIGHT, QUANTITY AND SPACING.



503D CUSTODIAL

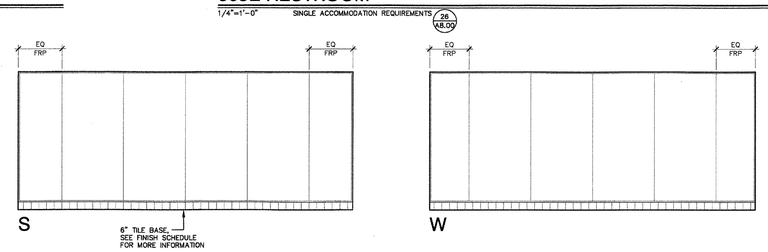
1/4"=1'-0"



503E RESTROOM

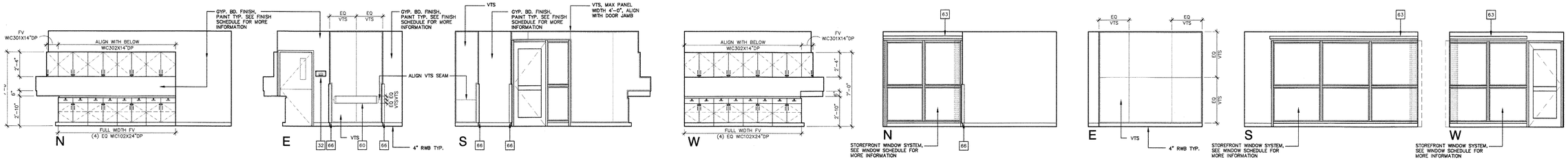
1/4"=1'-0"

SINGLE ACCOMMODATION REQUIREMENTS (26 A8.00)



503F DRY STORAGE

1/4"=1'-0"

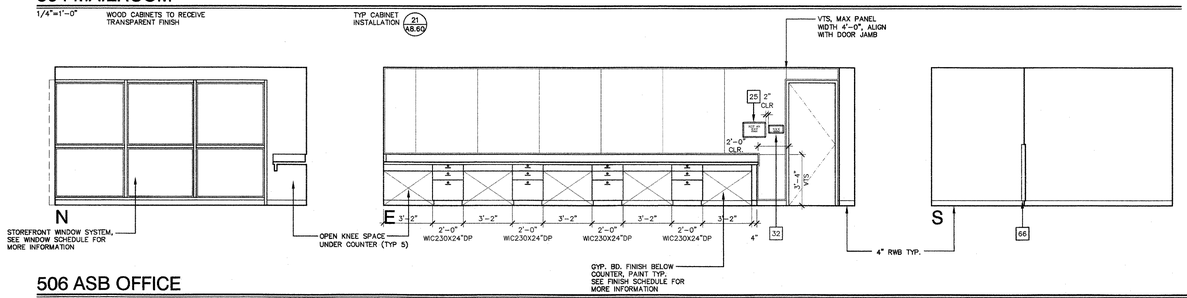


504 MAILROOM

1/4"=1'-0"

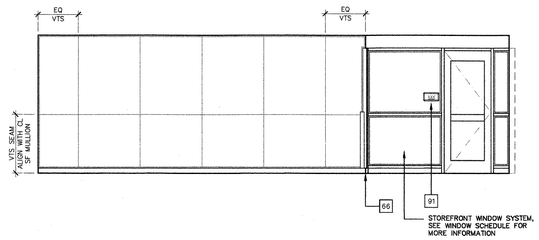
WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

TYP CABINET INSTALLATION (21 A8.60)



505 ASB DIRECTOR

1/4"=1'-0"



506 ASB OFFICE

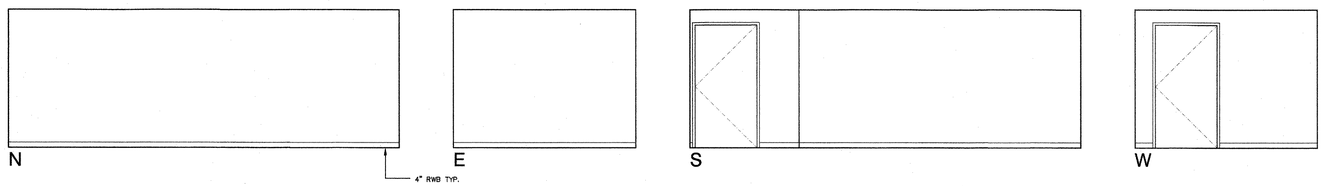
1/4"=1'-0"

WOOD CABINETS TO RECEIVE TRANSPARENT FINISH

PLASTIC LAMINATE COUNTER/ SPLASH/RETURN

TYP CABINET INSTALLATION (21 A8.60)

PROVIDE (5) GROMMETS AT COUNTER, SEE PLANS. COORDINATE WITH OWNER

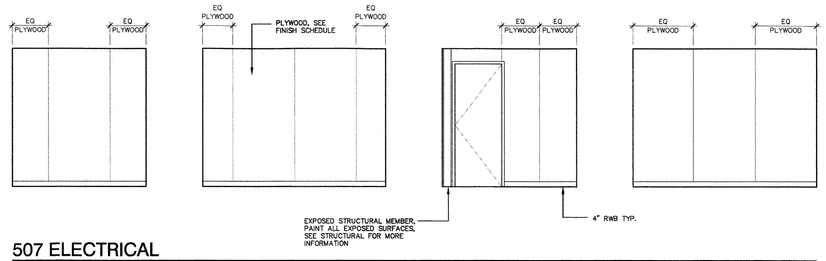


506A ASB STORAGE

1/4"=1'-0"

507 ELECTRICAL

1/4"=1'-0"



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ARCHITECT C-26729

CONSULTANT

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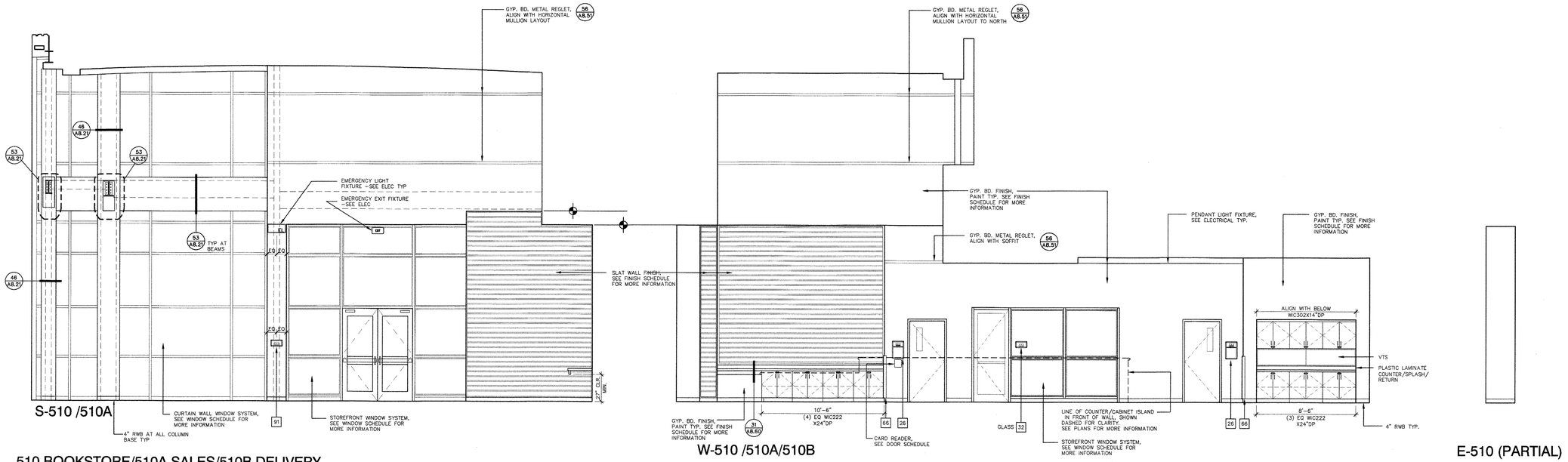
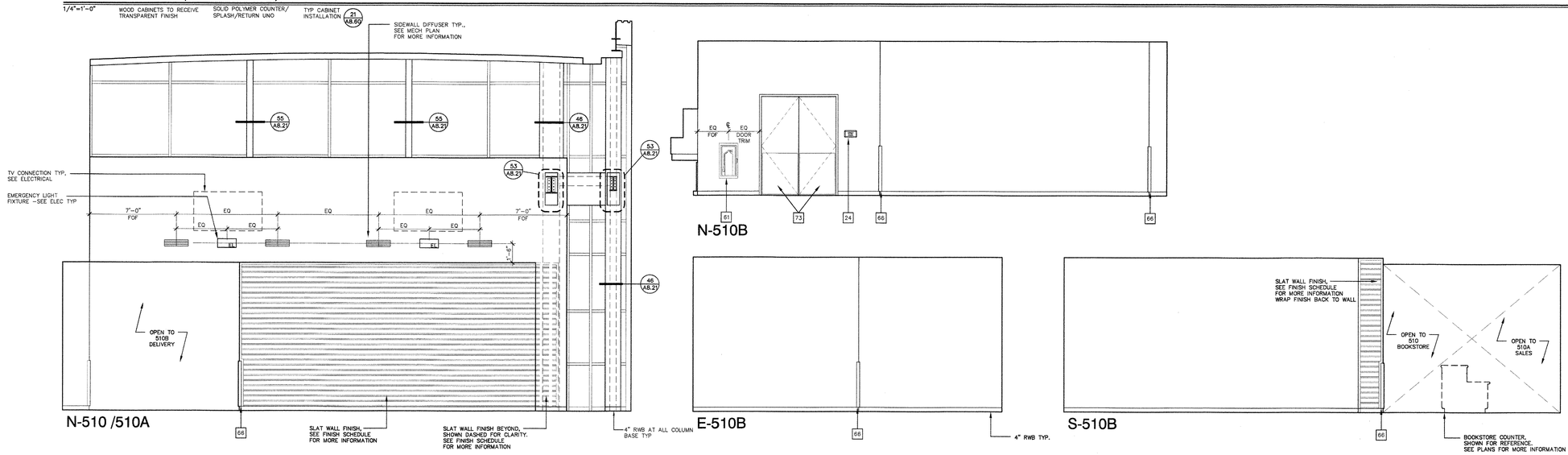
INTERIOR ELEVATIONS

A6.03



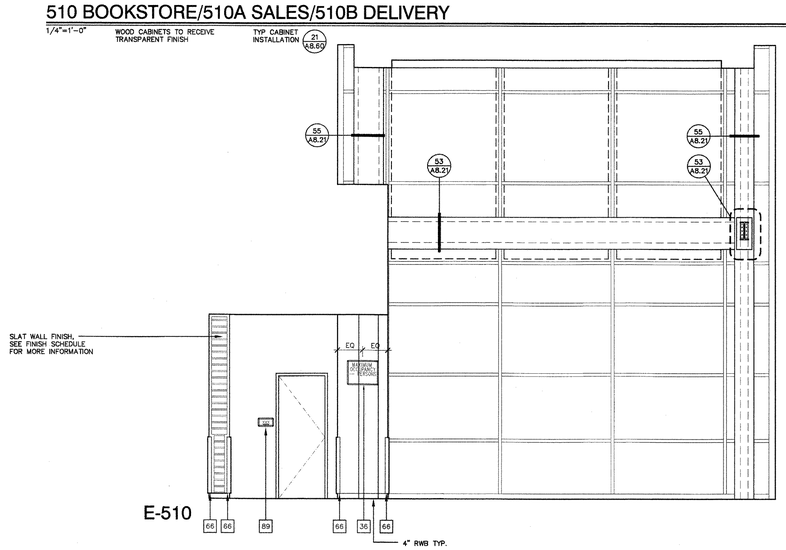
510 BOOKSTORE/510A SALES/510B DELIVERY

1/4"=1'-0"



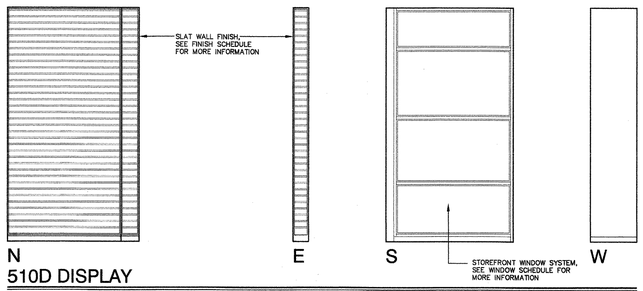
510 BOOKSTORE/510A SALES/510B DELIVERY

1/4"=1'-0"



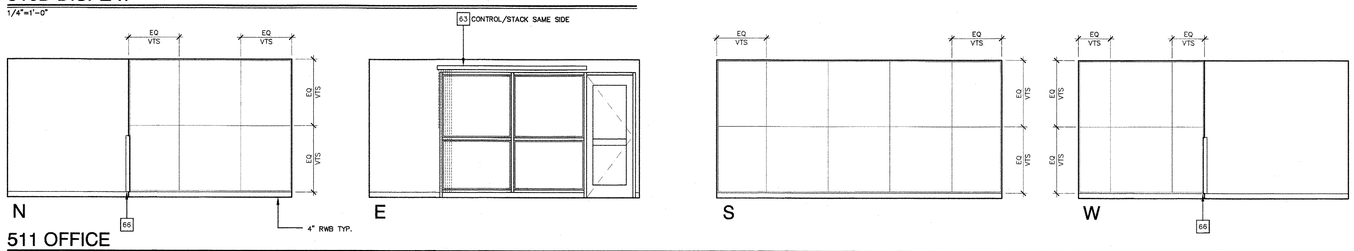
510D DISPLAY

1/4"=1'-0"



511 OFFICE

1/4"=1'-0"



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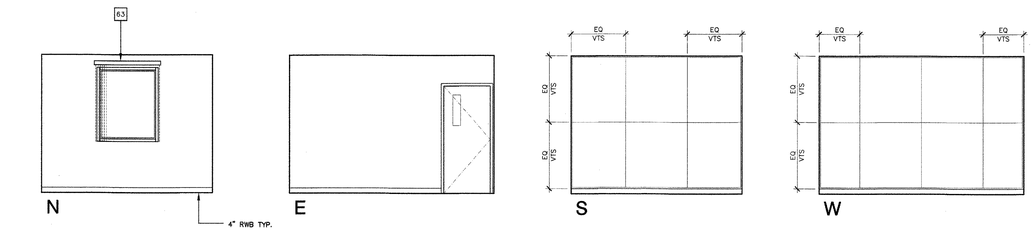
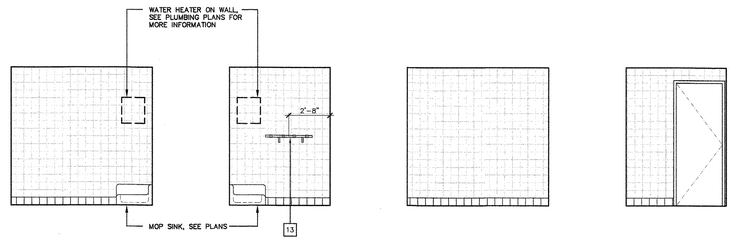
INTERIOR ELEVATIONS

A6.04



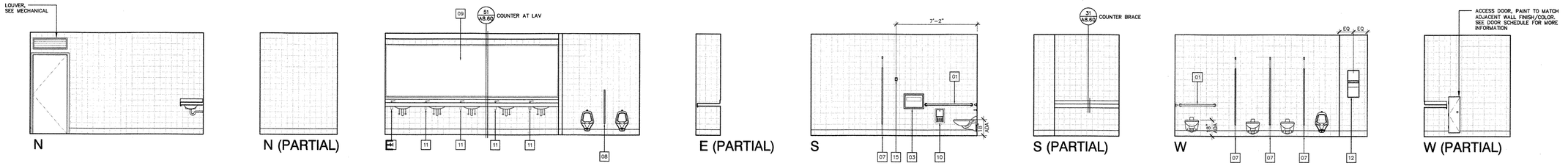
512 DIRECTOR

1/4"=1'-0"



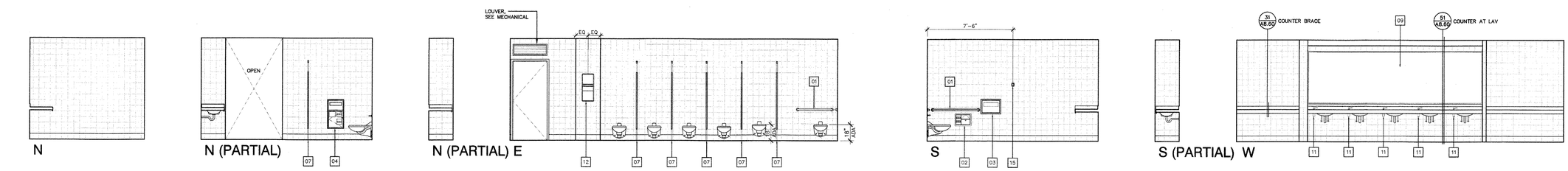
515 CUSTODIAL

1/4"=1'-0"



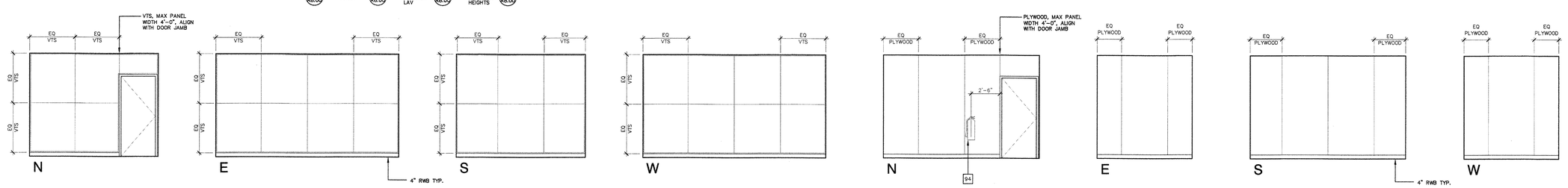
516 MEN

1/4"=1'-0" SOLID POLYMER COUNTER/SPLASH/RETURN UNO NON-ACCESSIBLE TOILET 24 A8.00 ACCESSIBLE TOILET 25 A8.00 ACCESSIBLE COUNTER LAV 34 A8.00 ACCESSORY MOUNTING HEIGHTS 55 A8.00 ACCESSIBLE URINAL 14 A8.00



517 WOMEN

1/4"=1'-0" SOLID POLYMER COUNTER/SPLASH/RETURN UNO NON-ACCESSIBLE TOILET 24 A8.00 ACCESSIBLE TOILET 25 A8.00 ACCESSIBLE COUNTER LAV 34 A8.00 ACCESSORY MOUNTING HEIGHTS 55 A8.00

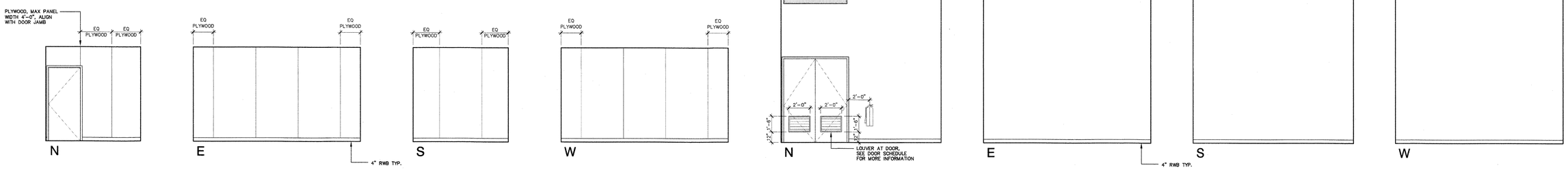


520 SECURITY OFFICE

1/4"=1'-0"

521 DATA

1/4"=1'-0"



522 ELEC

1/4"=1'-0"

523 BOILER

1/4"=1'-0"

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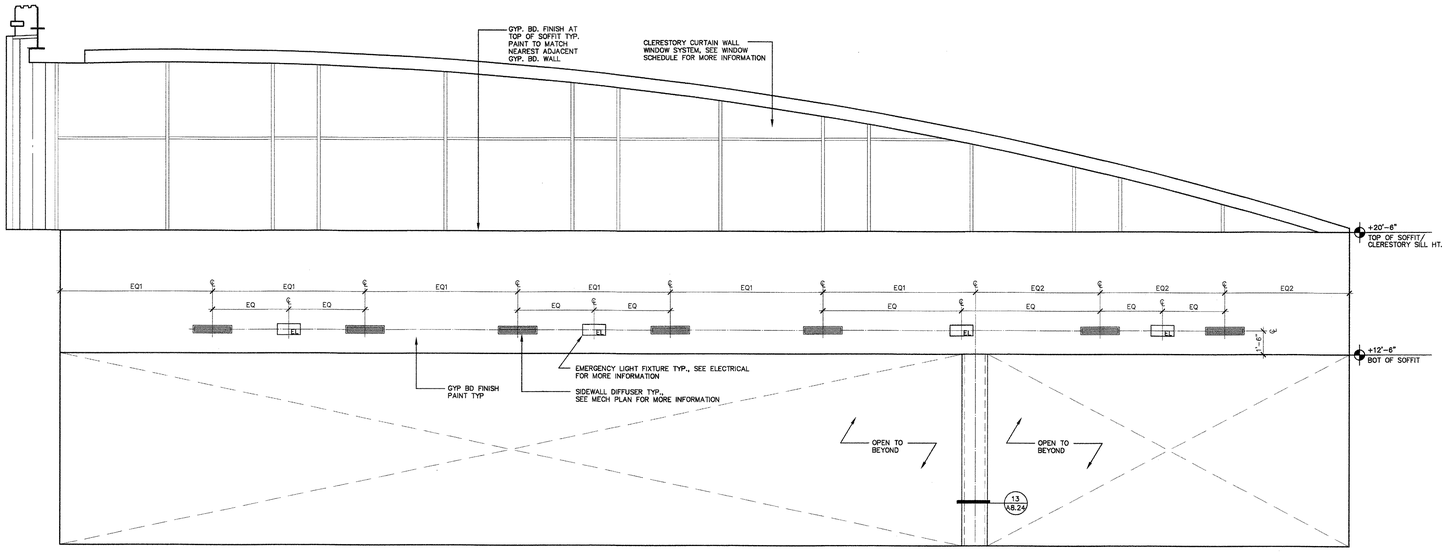
INTERIOR ELEVATIONS

A6.05



N-500/500A

500 STUDENT COMMONS/500A TV LOUNGE

1/4"=1'-0"

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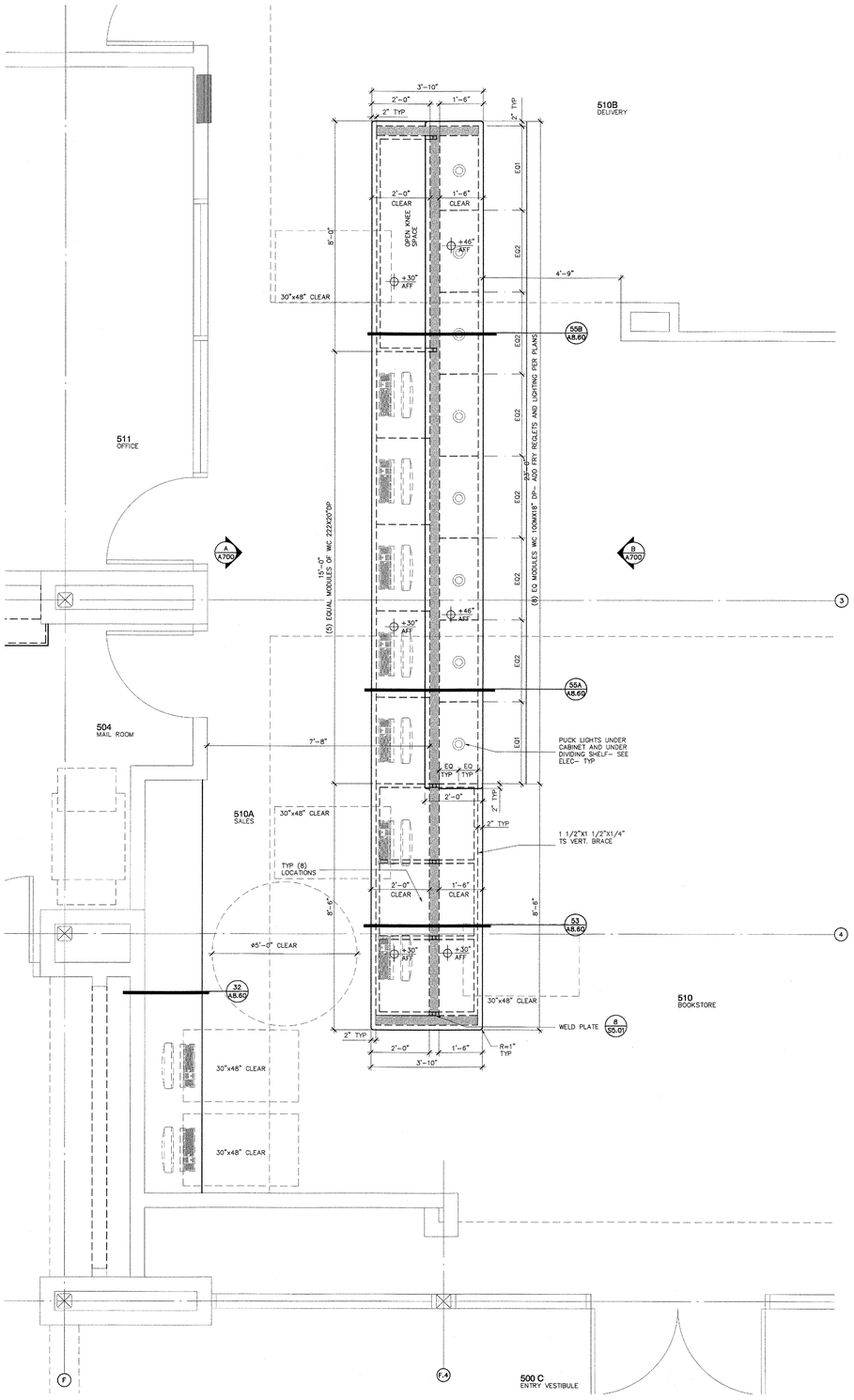
INTERIOR ELEVATIONS

A6.06



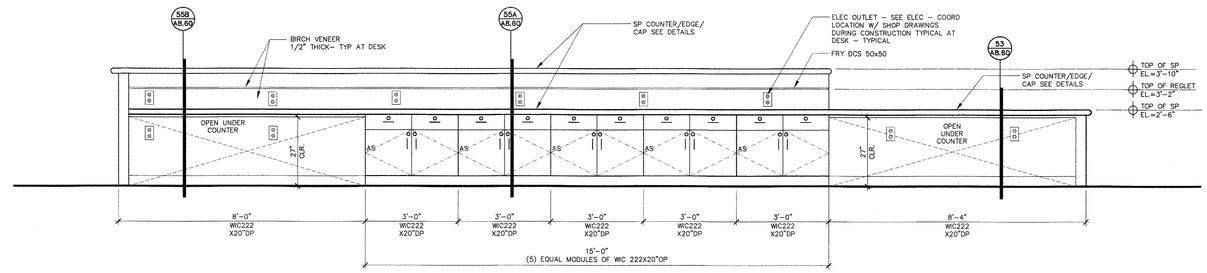
A. Partial Plan- Bookstore Desk

1/2"=1'-0"

21 A8.60 TYP CABINET INSTALLATION

1. ALL CABINETS TO RECEIVE STAIN/ TRANSPARENT FINISH SEE PROJECT MANUAL
2. BIRCH WOOD
3. ALL CABINETS AND DRAWERS TO RECEIVE LOCKS

NORTH

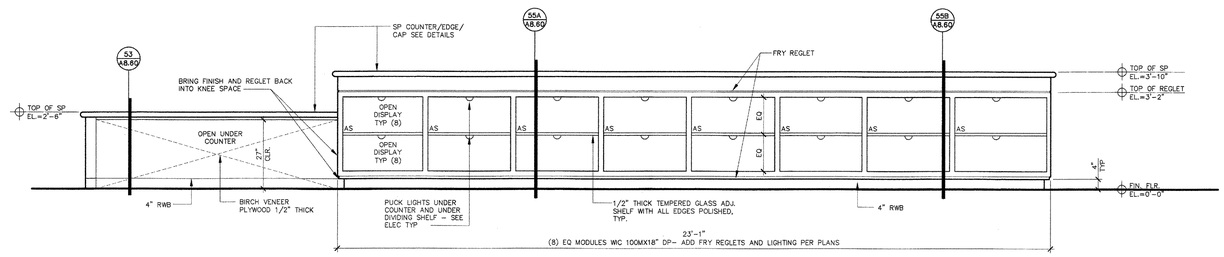


A. Elevation- Bookstore Desk

1/2"=1'-0"

21 A8.60 TYP CABINET INSTALLATION

1. ALL CABINETS TO RECEIVE STAIN/ TRANSPARENT FINISH SEE PROJECT MANUAL
2. BIRCH WOOD
3. ALL CABINETS AND DRAWERS TO RECEIVE LOCKS



B. Elevation- Bookstore Desk

1/2"=1'-0"

21 A8.60 TYP CABINET INSTALLATION

1. ALL CABINETS TO RECEIVE STAIN/ TRANSPARENT FINISH SEE PROJECT MANUAL
2. BIRCH WOOD
3. ALL CABINETS AND DRAWERS TO RECEIVE LOCKS

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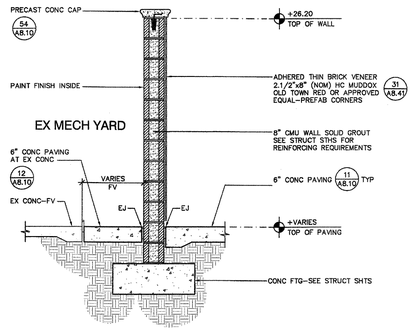
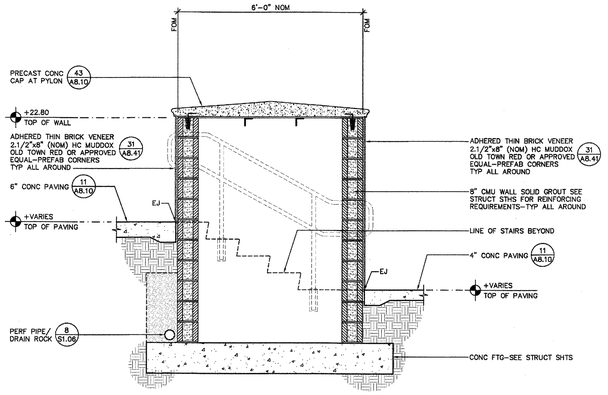
BOOKSTORE SERVICE COUNTER

A7.00



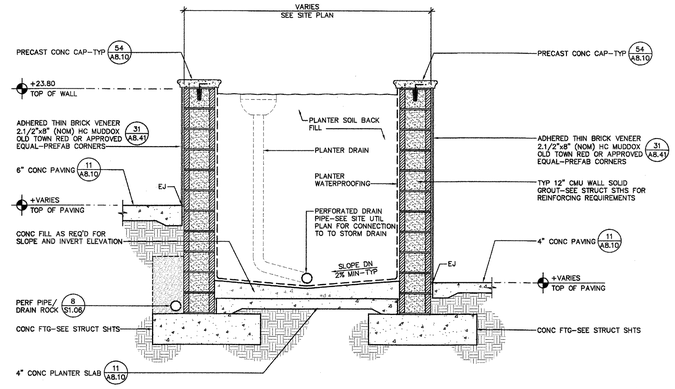
01 Mech Yard Wall Section

1/2"=1'-0"



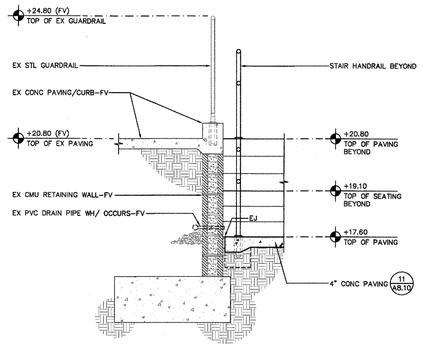
02 Typical Pylon At Stairs

1/2"=1'-0"



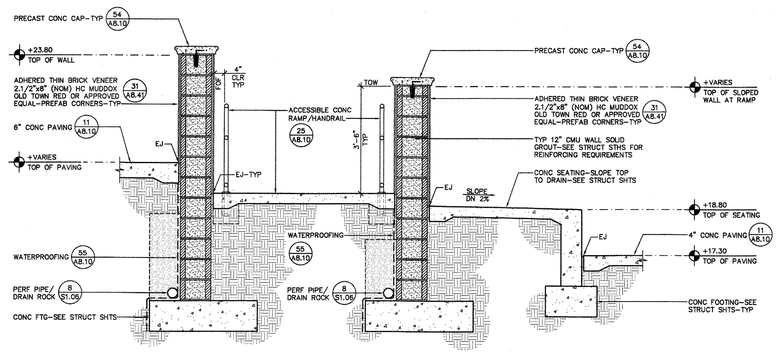
03 Planter A & B Section

1/2"=1'-0"



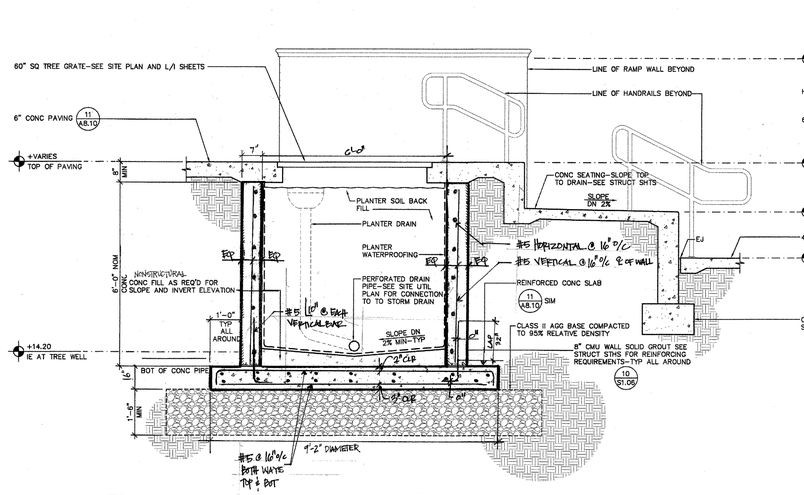
04 Finish At Ex Retaining Wall

1/2"=1'-0"



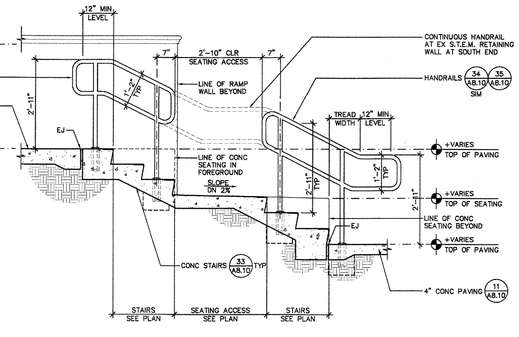
05 West Accessible Ramp / Seating Area Section

1/2"=1'-0"



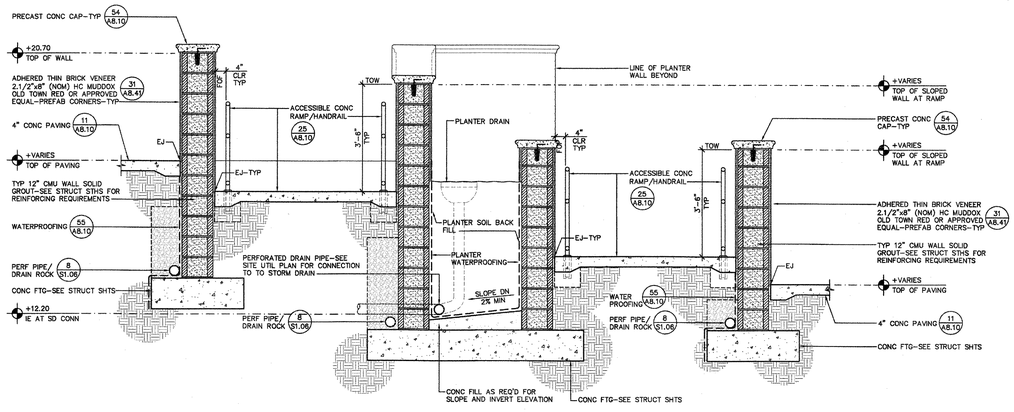
06 Tree Well / Seating Area Section

1/2"=1'-0"



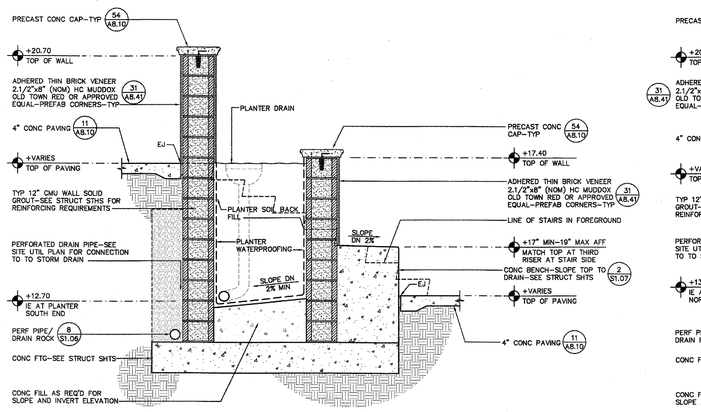
07 Aisle Access Stairs And Handrails

1/2"=1'-0"



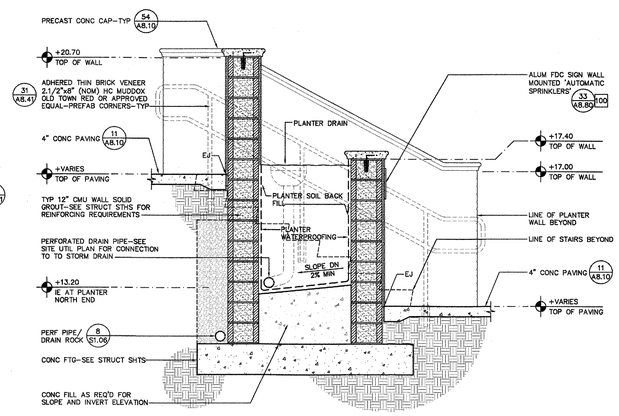
08 East Accessible Ramp / Planter C Section

1/2"=1'-0"



09 Planter D / Concrete Bench Section

1/2"=1'-0"



10 Planter D At Stairs

1/2"=1'-0"

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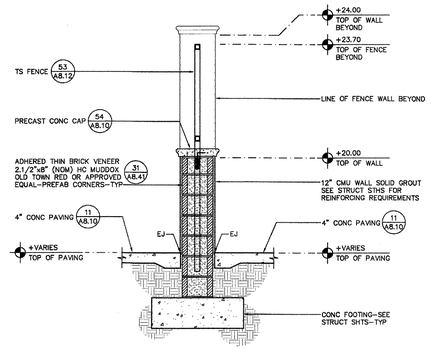
1	00.00.00	DESCRIPTION

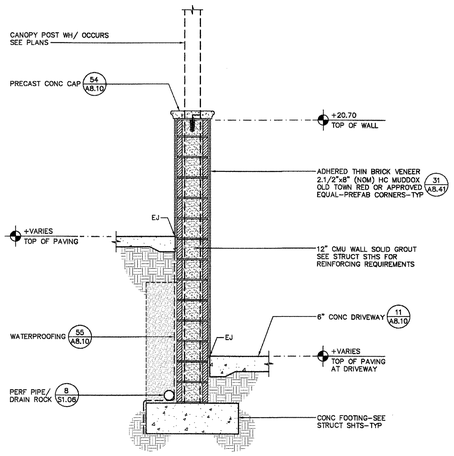
SITE WALL SECTIONS

A7.10



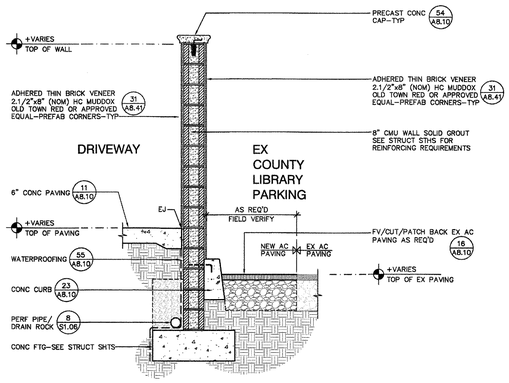
11 TS Fence / Wall At Dorms

1/2"=1'-0"



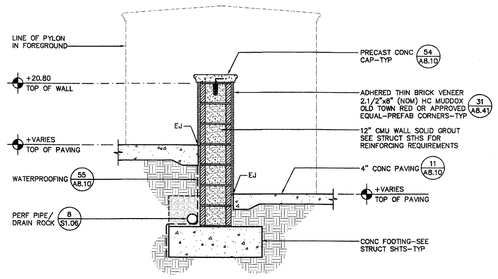
12 Retaining Wall At Driveway

1/2"=1'-0"



13 Fence Wall At County Library

1/2"=1'-0"

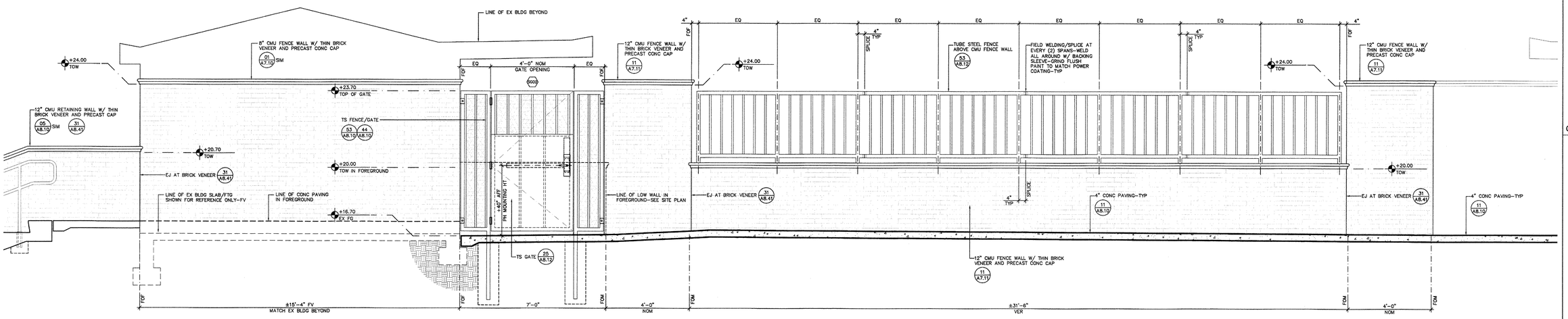


14 Retaining Wall At West Alley

1/2"=1'-0"

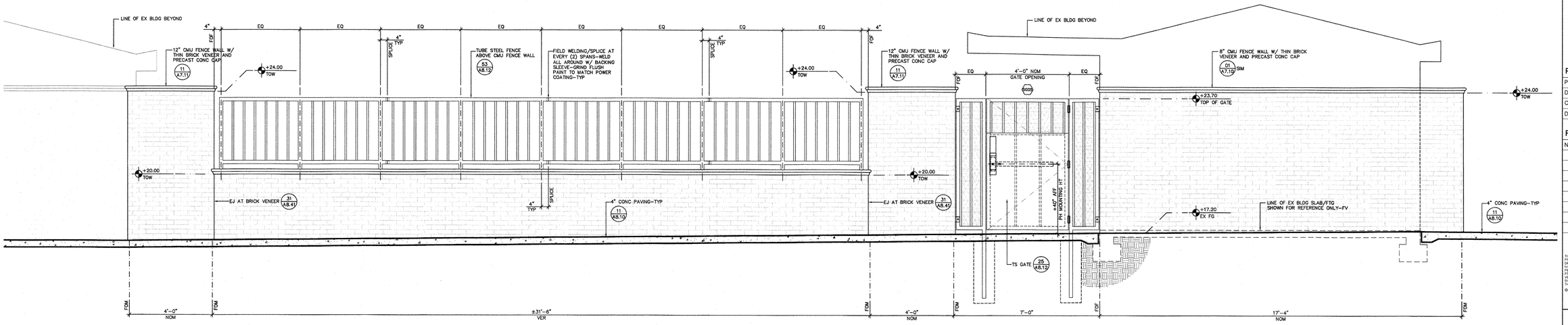
15 Not Used

1/2"=1'-0"



A Fence Wall North Elevation At Dorms - East Half

1/2"=1'-0"



B Fence Wall North Elevation At Dorms - West Half

1/2"=1'-0"

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ARCHITECT

LICENSED ARCHITECT KEVIN COBB C-26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACK FLS SS
DATE SEP 16 2015

PROJECT INFO

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Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

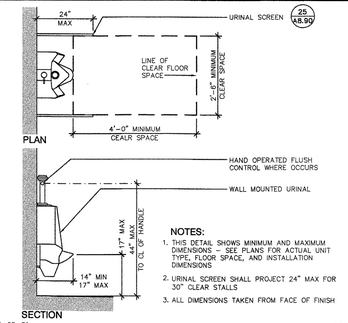
SITE WALL SECTIONS
SITE WALL ELEVATIONS

A7.11

11 NOT USED

12 NOT USED

13 NOT USED



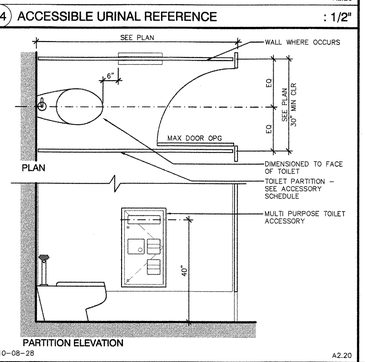
10-05-01 A2.20

14 ACCESSIBLE URINAL REFERENCE : 1/2"

21 NOT USED

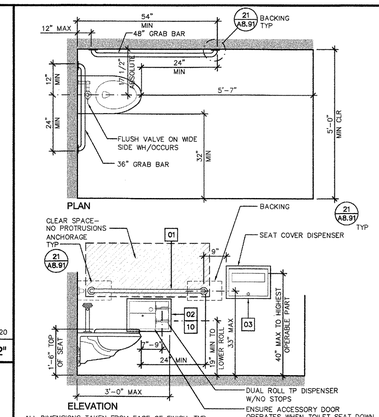
22 NOT USED

23 NOT USED



10-08-28 A2.20

24 NON ACCESSIBLE TOILET REFERENCE : 1/2"



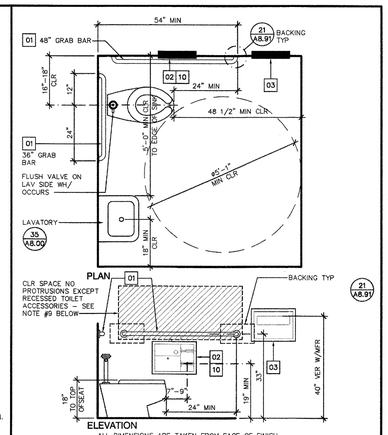
ALL DIMENSIONS TAKEN FROM FACE OF FINISH-TYP

GRAB BAR NOTES:

1. GRAB BARS DIA OR WIDTH OF GRIPPING SURFACE IS REQUIRE TO BE 1 1/2" OUTSIDE DIA.
2. THE SPACE BETWEEN WALL FIN AND BAR IS TO BE 1 1/2" CLR.
3. GRAB BARS SHALL NOT ROTATE WITHIN THEIR FITTINGS.
4. GRAB BARS AND ANY ADJACENT SURFACE SHALL NOT HAVE ANY SHARP OR ABRASIVE ELEMENTS, EDGES ARE TO HAVE A MINIMUM RADIUS OF 1/8".
5. BENDING STRESS IN A GRAB BAR OR SEAT INDUCED BY THE MAXIMUM BENDING MOMENT FROM THE APPLICATION OF A 250 LBS POINT LOAD SHALL BE LESS THAN THE ALLOWABLE STRESS FOR THE MTL OF THE GRAB BAR OR SEAT.
6. SHEAR STRESS INDUCED IN A GRAB BAR OR SEAT BY THE APPLICATION OF A 250 LB POINT LOAD SHALL BE LESS THAN THE ALOWABLE SHEAR STRESS FOR THE MTL OF THE GRAB BAR OR SEAT, AND ITS MOUNTING BRACKET OR OTHER SUPPORT IS CONSIDERED TO BE FULLY RESTRAINED, THEN DIRECT AND TORSIONAL SHEAR STRESSES SHALL NOT EXCEED THE ALLOWABLE SHEAR STRESS.
7. SHEAR FORCE INDUCED IN FASTENER OR MOUNTING DEVICE FROM THE APPLICATION OF A 250 LB POINT LOAD SHALL BE LESS THAN THE ALLOWABLE LATERAL LOAD OF EITHER THE FASTENER OR MOUNTING DEVICE OR THE SUPPORTING STRUCTURE WHICHEVER IS THE SMALLER ALLOWABLE LOAD.
8. TENSILE FORCE INDUCED IN A FASTENER BY A DIRECT MOMENT FROM THE APPLICATION OF A 250 LB POINT LOAD, SHALL BE LESS THAN THE ALLOWABLE WITHDRAWAL LOAD BETWEEN THE FASTENER AND SUPPORTING STRUCTURE.
9. ACCESSORIES/DISPENSERS TO BE NO CLOSER THAN 1 1/2" BELOW, 1 1/2" AT ENDS AND 18" ABOVE GRAB BARS EXCEPT IF ACCESSORIES ARE RECESSED, FLUSH W/ WALL, AND HAVE NO SHARP EDGES.

10-05-11 A2.20

25 ACESSIBLE MULTIPLE ACCOMMODATION TOILET STALL TYPICAL REFERENCE REQUIREMENTS :1/2"



ALL DIMENSIONS ARE TAKEN FROM FACE OF FINISH

GRAB BAR NOTES:

1. GRAB BAR DIA OR WIDTH OF GRIPPING SURFACE IS REQUIRED TO BE 1 1/2" OUTSIDE DIA.
2. THE SPACE BETWEEN WALL FIN AND BAR IS TO BE 1 1/2" CLR.
3. GRAB BARS SHALL NOT ROTATE WITHIN THEIR FITTINGS.
4. GRAB BARS AND ANY ADJACENT SURFACE SHALL NOT HAVE ANY SHARP OR ABRASIVE ELEMENTS; EDGES ARE TO HAVE A MINIMUM RADIUS OF 1/8".
5. BENDING STRESS IN A GRAB BAR OR SEAT INDUCED BY THE MAXIMUM BENDING MOMENT FROM THE APPLICATION OF A 250-lb POINT LOAD SHALL BE LESS THAN THE ALLOWABLE STRESS FOR THE MTL OF THE GRAB BAR OR SEAT.
6. SHEAR STRESS INDUCED IN A GRAB BAR OR SEAT BY THE APPLICATION OF A 250-lb POINT LOAD SHALL BE LESS THAN THE ALLOWABLE SHEAR STRESS FOR THE MTL OF THE GRAB BAR OR SEAT, AND ITS MOUNTING BRACKET OR OTHER SUPPORT IS CONSIDERED TO BE FULLY RESTRAINED, THEN DIRECT AND TORSIONAL SHEAR STRESSES SHALL NOT EXCEED THE ALLOWABLE SHEAR STRESS.
7. SHEAR FORCE INDUCED IN FASTENER OR MOUNTING DEVICE FROM THE APPLICATION OF A 250 lb POINT LOAD SHALL BE LESS THAN THE ALLOWABLE LATERAL LOAD OF EITHER THE FASTENER OR MOUNTING DEVICE OR THE SUPPORTING STRUCTURE WHICHEVER IS THE SMALLER ALLOWABLE LOAD.
8. TENSILE FORCE INDUCED IN A FASTENER BY A DIRECT MOMENT FROM THE APPLICATION OF A 250 lb POINT LOAD, SHALL BE LESS THAN THE ALLOWABLE WITHDRAWAL LOAD BETWEEN THE FASTENER AND SUPPORTING STRUCTURE.
9. ACCESSORIES/DISPENSERS TO BE NO CLOSER THAN 1 1/2" BELOW, 1 1/2" AT ENDS AND 18" ABOVE GRAB BARS EXCEPT IF ACCESSORIES ARE RECESSED, FLUSH WITH WALL, AND HAVE NO SHARP EDGES.

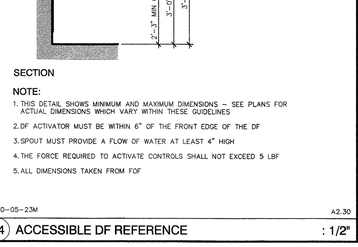
10-05-08M A2.20

26 ACCESSIBLE SINGLE ACCOMMODATION TOILET REFERENCE REQUIREMENTS :1/2"

31 NOT USED

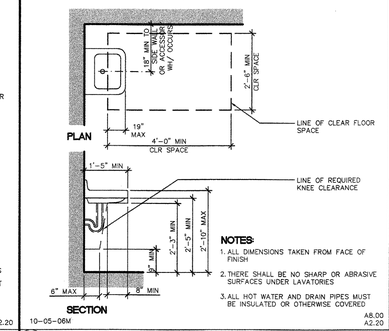
32 NOT USED

33 NOT USED



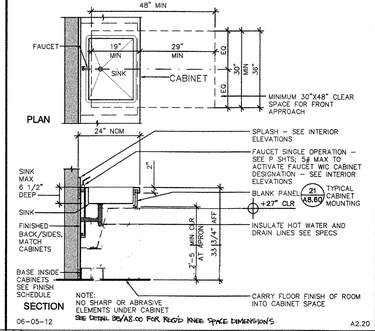
10-05-24M A2.20

34 ACCESSIBLE COUNTER LAV REFERENCE : 1/2"



A8.00
10-05-06M A2.20

35 ACCESSIBLE LAVATORY REFERENCE : 1/2"



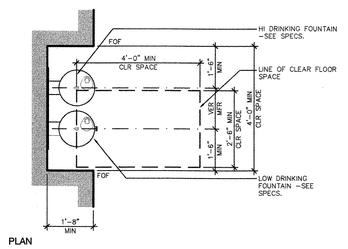
06-05-12 A2.20

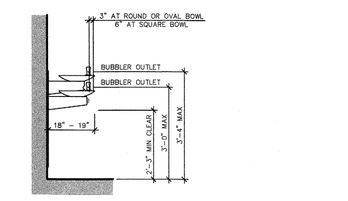
36 ACCESSIBLE SINK AT CABINET : 1/2"

41 NOT USED

42 NOT USED

43 NOT USED

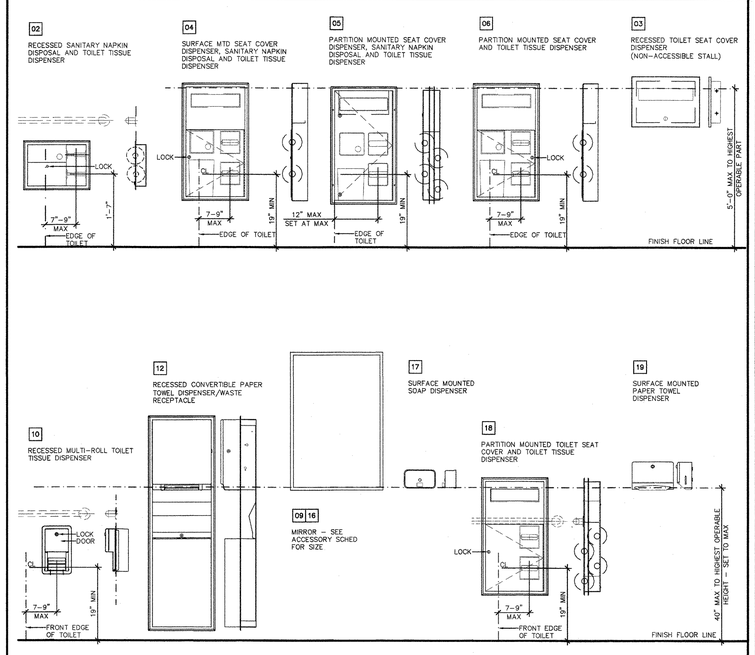




NOTE:
1. THIS DETAIL SHOWS MINIMUM AND MAXIMUM DIMENSIONS - SEE PLANS FOR ACTUAL DIMENSIONS WHICH VARY WITHIN THESE GUIDELINES
2. DF ACTIVATOR MUST BE WITHIN 6" OF THE FRONT EDGE OF THE DF
3. SPOUT MUST PROVIDE A FLOW OF WATER AT LEAST 4" HIGH
4. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL NOT EXCEED 5 LBF
5. ALL DIMENSIONS TAKEN FROM FOF

10-05-23M A2.30

54 ACCESSIBLE DF REFERENCE : 1/2"



10-05-03M A2.00

55 ACCESSORY MOUNTING HEIGHTS : 3/4"

41 NOT USED

42 NOT USED

44 NOT USED

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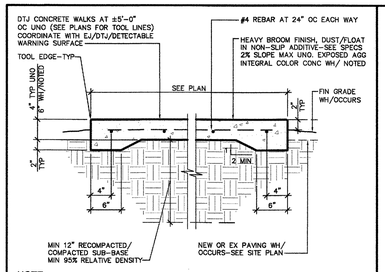
DETAILS

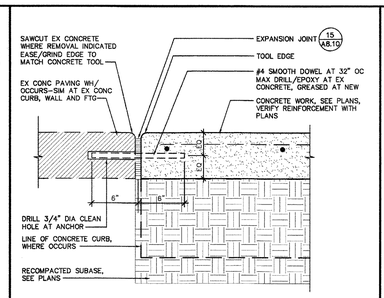
A8.00



NOTE:
PROVIDE DEEP TOOL JOINTS (DTJ) AT 5'-0" OC MAX AND EXPANSION JOINTS (EJ) AT 20'-0" OC MAX, OTHER LOCATIONS ON PLANS AND AT START/FINISH OF ALL RADIUS AND DIRECTION CHANGES. SEE PLANS FOR ADDITIONAL JOINTS, #4x12" DOWELS AT 24" OC AT CONCRETE PAVING/SLAB/FOUNDATIONS AND ATTACHMENT TO OTHER WALLS AND RELATED ITEMS. (15 A8.10)

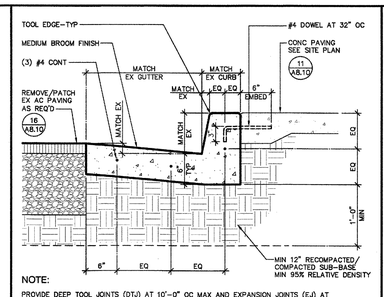
02-01-04M A8.11 A1.20

11 CONCRETE PAVING : 1"



02-01-24M A1.20

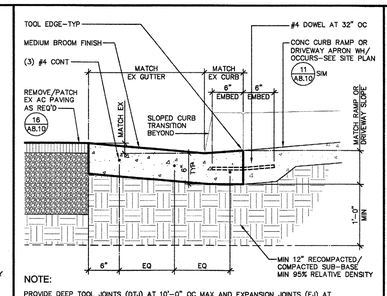
12 CONCRETE TO EXISTING CONCRETE : 1.1/2"



NOTE:
PROVIDE DEEP TOOL JOINTS (DTJ) AT 10'-0" OC MAX AND EXPANSION JOINTS (EJ) AT 20'-0" OC MAX AND AT START/FINISH OF ALL RADIUS AND DIRECTION CHANGES. 12" GREASED 1/2" DOWEL AT EACH EJ (6" EACH SIDE, STOP REBAR EACH SIDE) (15 A8.10) DRILL/EPOXY #4x12" DOWELS AT EXISTING CONCRETE, WHERE OCCURS. A8.12 A8.11 A1.20

02-01-02M

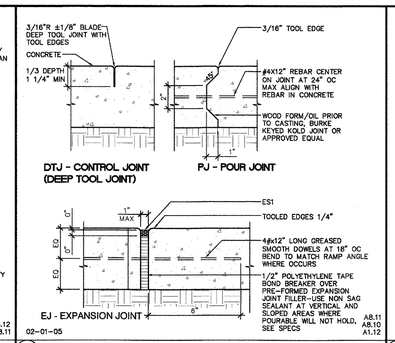
13 CONCRETE CURB/GUTTER : 1"



NOTE:
PROVIDE DEEP TOOL JOINTS (DTJ) AT 10'-0" OC MAX AND EXPANSION JOINTS (EJ) AT 20'-0" OC MAX AND AT START/FINISH OF ALL RADIUS AND DIRECTION CHANGES. 12" GREASED 1/2" DOWEL AT EACH EJ (6" EACH SIDE, STOP REBAR EACH SIDE) (15 A8.10)

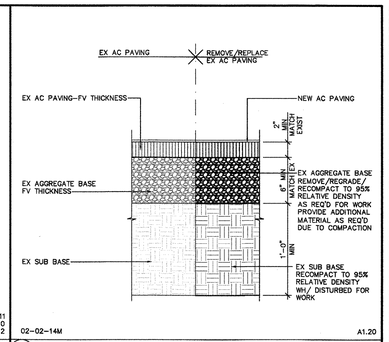
02-01-05M A8.12 A8.11

14 CONCRETE CURB/GUTTER - FLUSH : 1"



02-01-05M A8.11 A8.10 A1.12

15 TYP JOINTS AT CONCRETE : 3"

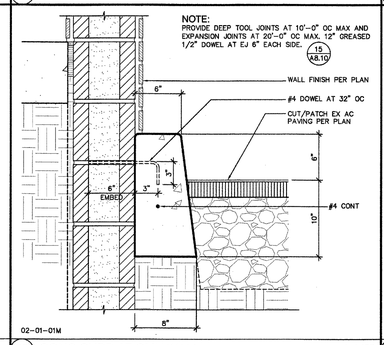


02-02-14M A1.20

16 AC PAVING SECTIONS : 1.1/2"

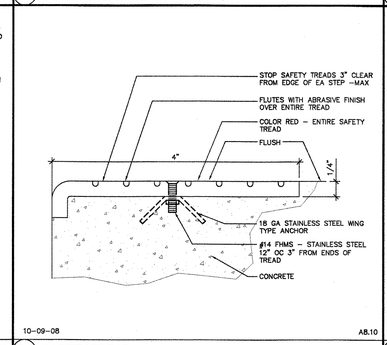
21 NOT USED

22 NOT USED



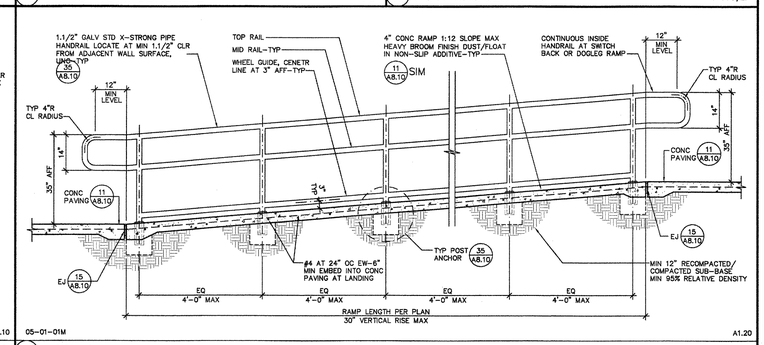
02-01-01M

23 CONC CURB AT CMU WALL : 1.1/2"



10-09-08 A8.10

24 SAFETY TREAD : NTS

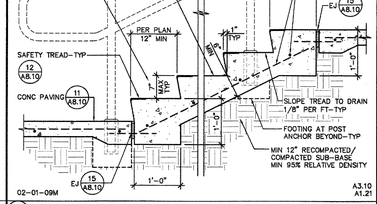


05-01-01M A1.20

25 ACCESSIBLE RAMP/HANDRAIL : 1/2"

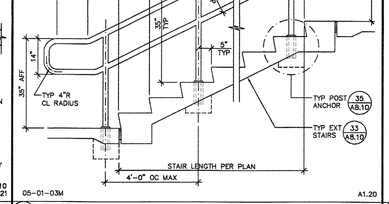
31 NOT USED

32 NOT USED



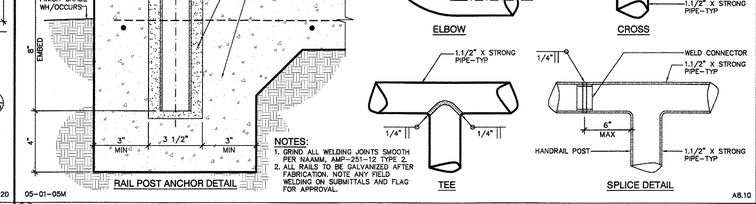
02-01-09W A3.10 A1.21

33 TYPICAL EXTERIOR STAIR : 3/4"



05-01-03M A1.20

34 STAIR HANDRAIL : 1/2"

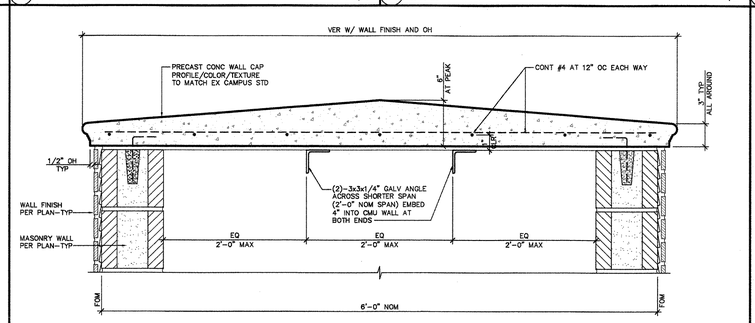


A8.10

35 RAIL CONSTRUCTION DETAIL : 3"

41 NOT USED

42 NOT USED



A7.10

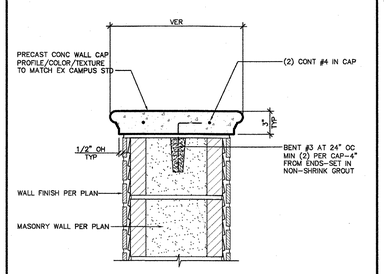
43 PRECAST CONC CAP AT PYLON : 1.1/2"

07-10-01 A7.10 A7.11

55 TYPICAL DAMPROOFING : NTS

51 NOT USED

52 NOT USED



A7.10 A7.11

54 PRECAST CONC CAP : 1.1/2"

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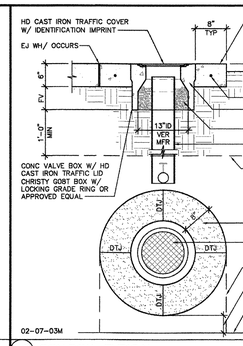
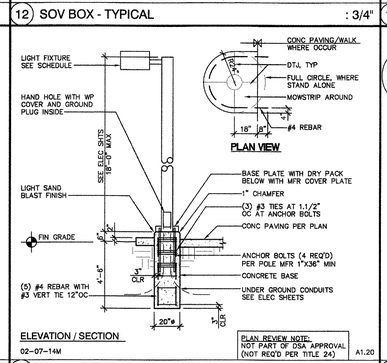
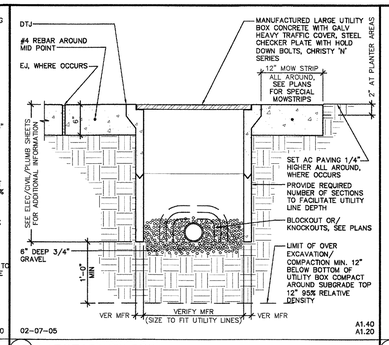
A8.10



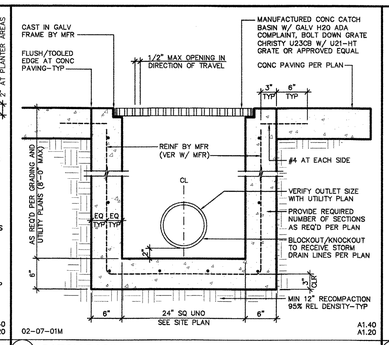
11 NOT USED



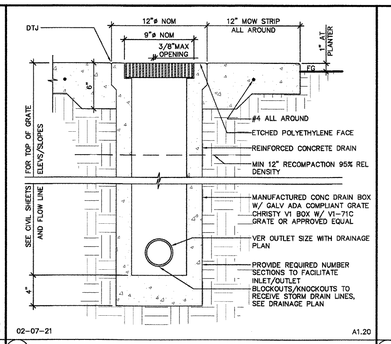
12 SOV BOX - TYPICAL : 3/4"



13 LARGE UTILITY BOX : 1"



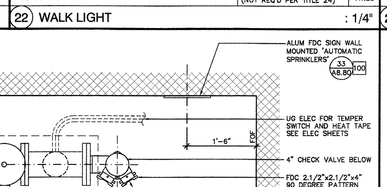
14 CATCH BASIN : 1"



15 AREA DRAIN : 1.1/2"

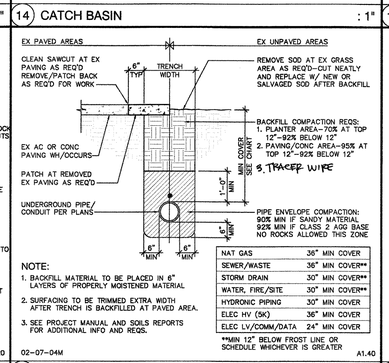
16 NOT USED

21 NOT USED

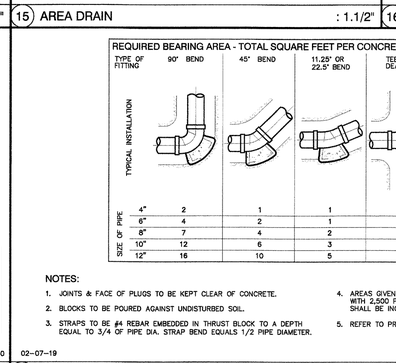


22 WALK LIGHT : 1/4"

23 LIGHT BOLLARD - LOW : 3/4"

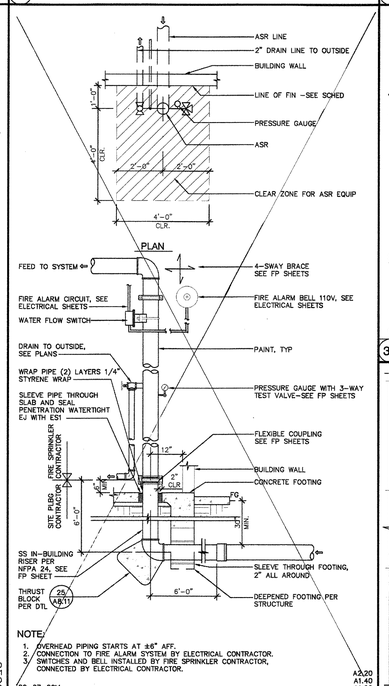


24 TYPICAL UTILITY TRENCH : 1/2"

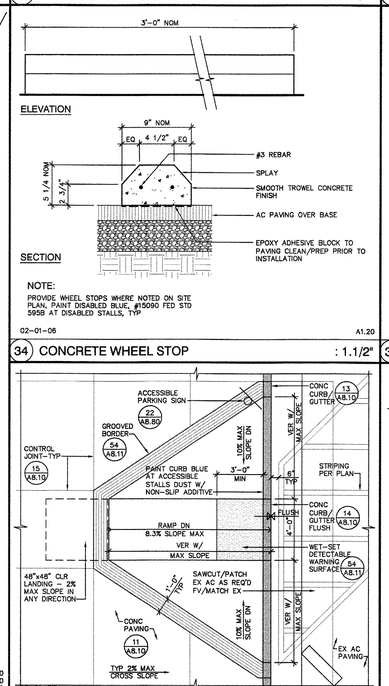


25 TYP. THRUST BLOCK :NTS

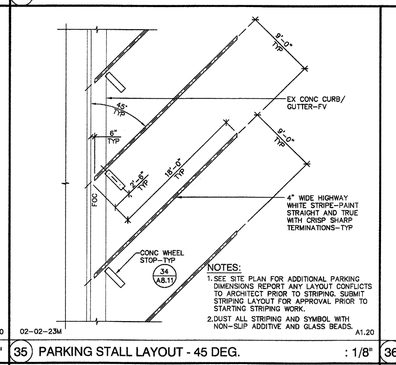
41 6" ASR SERVICE CONN. BACKFLOW PREVENTER W/ FDC : 3/4"



43 NOT USED



34 CONCRETE WHEEL STOP : 1.1/2"

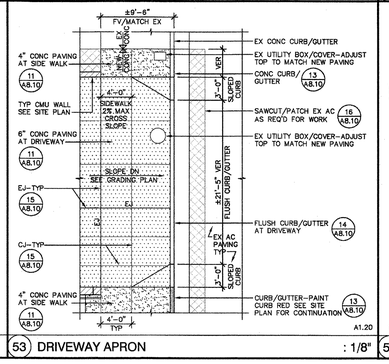


35 PARKING STALL LAYOUT - 45 DEG. : 1/8"

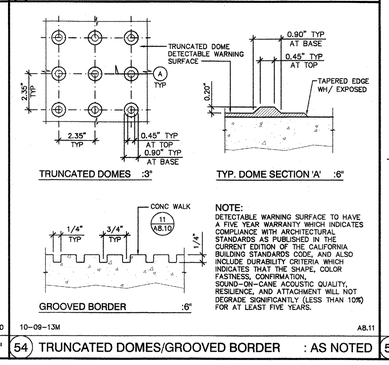
36 NOT USED

51 NOT USED

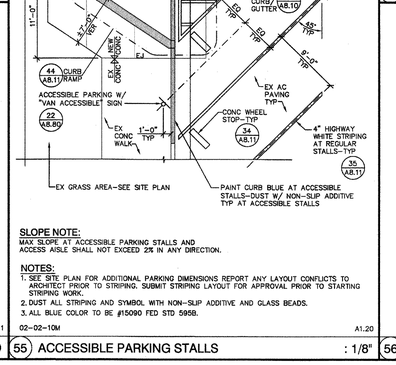
52 NOT USED



53 DRIVEWAY APRON : 1/8"



54 TRUNCATED DOMES/GROOVED BORDER : AS NOTED



55 ACCESSIBLE PARKING STALLS : 1/8"

56 NOT USED

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West Kern Community College District

DSA SET

ARCHITECT

LICENSED ARCHITECT KEVIN COBB C-26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACTIVITY FLS SS
DATE SEP 16 2015

PROJECT INFO

Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

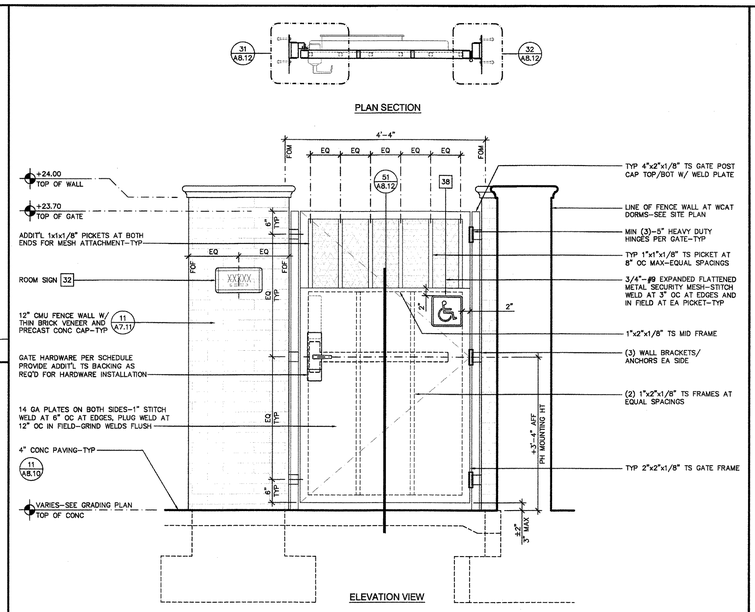
A8.11

11 NOT USED

12 NOT USED

21 NOT USED

22 NOT USED

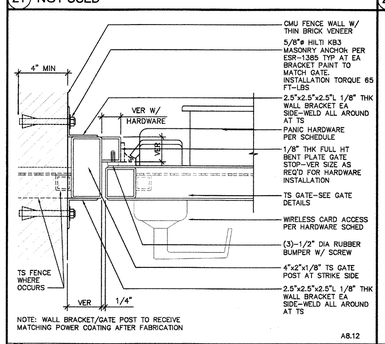


NOTES:
1. GRIND EDGES AND WELDING JOINTS SMOOTH PER NAAMM, AMP–251–12 TYPE 2.
2. FENCE/GATE TO RECEIVE POWDER COATING AFTER FABRICATION. NO FIELD WELDING ALLOWED UNLESS NOTED AND APPROVED IN SUBMITTALS.

02–11–04M A2.10

23 TS GATE AT WCAT DORMS - SG03 (SG04 SIM) : 3/4"

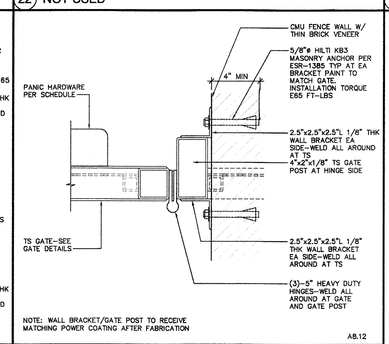
25 TS GATE AT WCAT DORMS - SG05 (SG02 SIM) : 3/4"



NOTE: WALL BRACKET/GATE POST TO RECEIVE MATCHING POWER COATING AFTER FABRICATION

A8.12

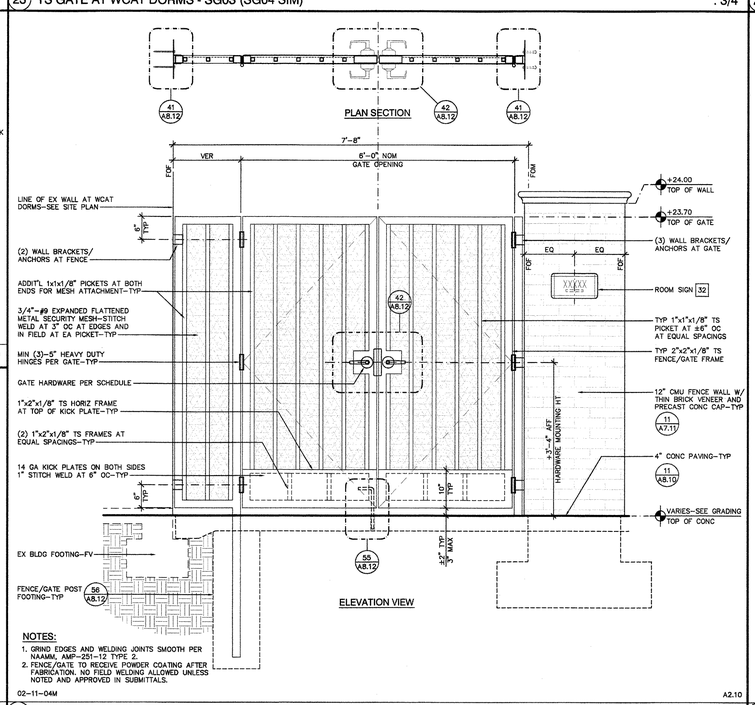
31 TS GATE FRAME AT WALL : 3"



NOTE: WALL BRACKET/GATE POST TO RECEIVE MATCHING POWER COATING AFTER FABRICATION

A8.12

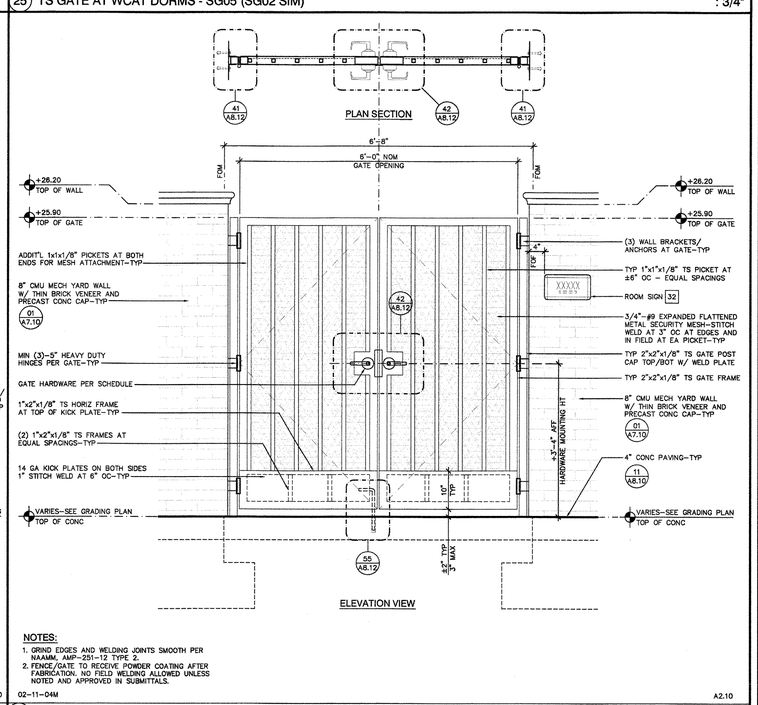
32 TS GATE FRAME AT WALL : 3"



NOTES:
1. GRIND EDGES AND WELDING JOINTS SMOOTH PER NAAMM, AMP–251–12 TYPE 2.
2. FENCE/GATE TO RECEIVE POWDER COATING AFTER FABRICATION. NO FIELD WELDING ALLOWED EXCEPT WH/ NOTED ON ELEVATIONS ON SHEET A7.11.

02–11–11M A7.11 A8.12

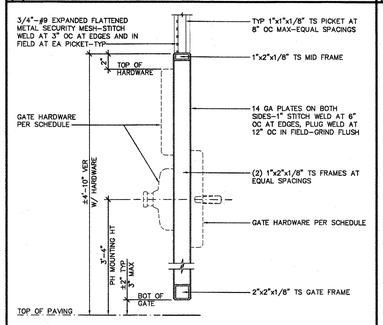
43 TS GATES AT STOR YARD - SG06 (SG01 AT UTIL YARD-SIM) : 3/4"



NOTES:
1. GRIND EDGES AND WELDING JOINTS SMOOTH PER NAAMM, AMP–251–12 TYPE 2.
2. FENCE/GATE TO RECEIVE POWDER COATING AFTER FABRICATION. NO FIELD WELDING ALLOWED UNLESS NOTED AND APPROVED IN SUBMITTALS.

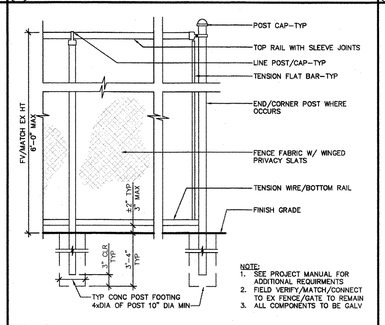
02–11–04M A2.10 A7.11

45 TS GATES AT EX MECH YARD - SG07 : 3/4"



A8.12

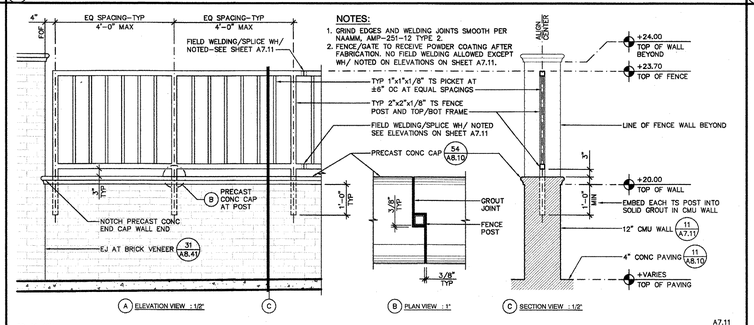
51 TS GATE SECTION AT PANIC HARDWARE : 1.1/2"



NOTE:
1. SEE PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS
2. FIELD VERIFY/MATCH/CONNECT TO EX FENCE/GATE TO REMAIN
3. ALL COMPONENTS TO BE GALV

02–11–01M A1.20

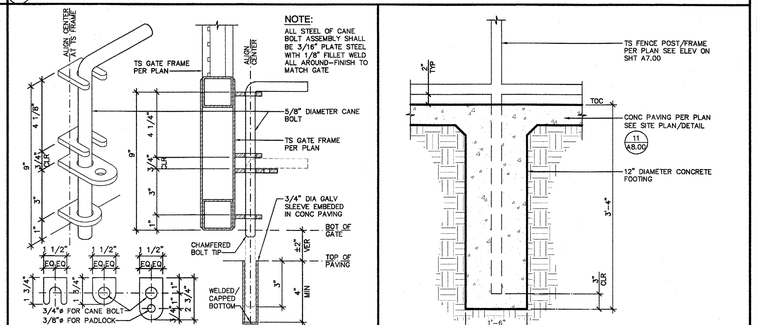
52 CHAINLINK FENCE : 3/4"



NOTES:
1. GRIND EDGES AND WELDING JOINTS SMOOTH PER NAAMM, AMP–251–12 TYPE 2.
2. FENCE/GATE TO RECEIVE POWDER COATING AFTER FABRICATION. NO FIELD WELDING ALLOWED EXCEPT WH/ NOTED ON ELEVATIONS ON SHEET A7.11.

A7.11 A8.12

53 TS FENCE AT WCAT DORMS : AS NOTED



NOTES:
1. GRIND EDGES AND WELDING JOINTS SMOOTH PER NAAMM, AMP–251–12 TYPE 2.
2. FENCE/GATE TO RECEIVE POWDER COATING AFTER FABRICATION. NO FIELD WELDING ALLOWED UNLESS NOTED AND APPROVED IN SUBMITTALS.

02–11–04M A2.10

55 CANE BOLT ASSEMBLY : 3"

A8.12

56 TS FENCE FOOTING : 1"

NOTE:
ALL STEEL OF CANE BOLT ASSEMBLY SHALL BE 3/16" PLATE STEEL WITH 1/8" FILLET WELD ALL AROUND–FINISH TO MATCH GATE

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KEVIN COBB, AIA
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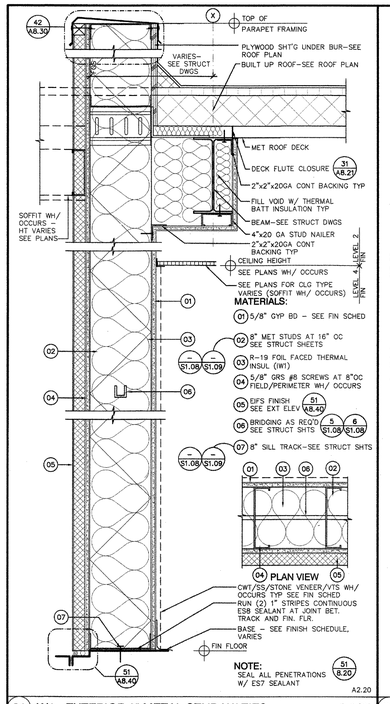
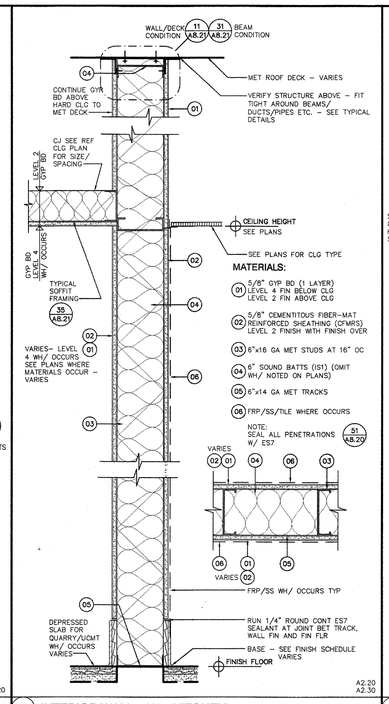
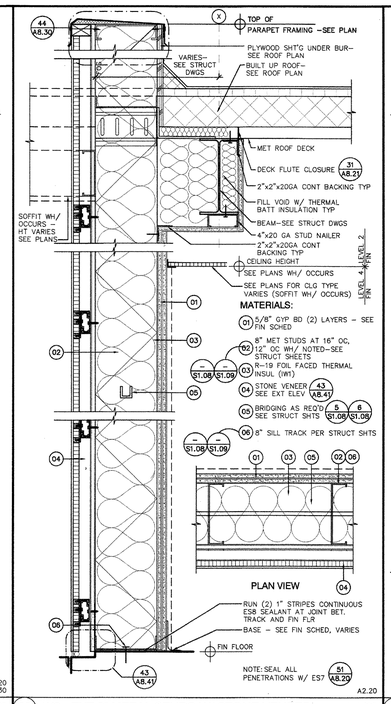


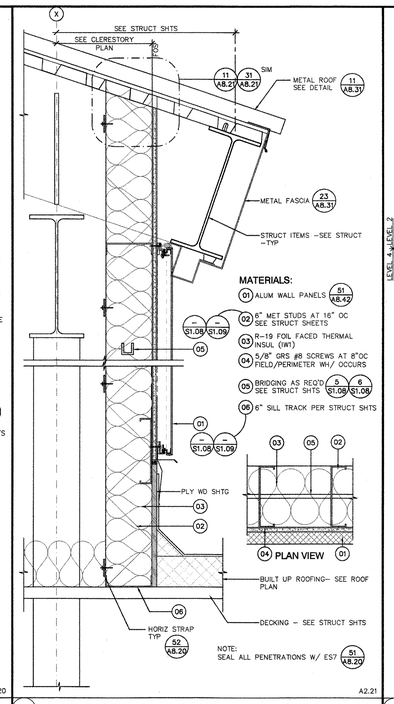
21 W1 - EXTERIOR 8" METAL STUD W/ EIFS : 1 1/2"



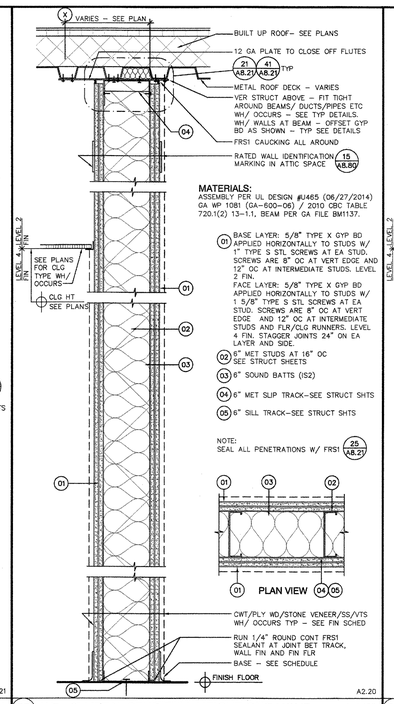
22 INTERIOR WALL - W2 (KITCHEN) : 1 1/2"



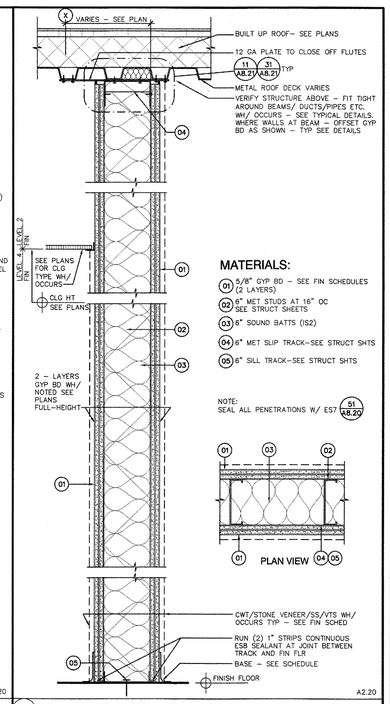
23 W3 - EXT 8" METAL STUDS W/ STONE VENEER : 1 1/2"



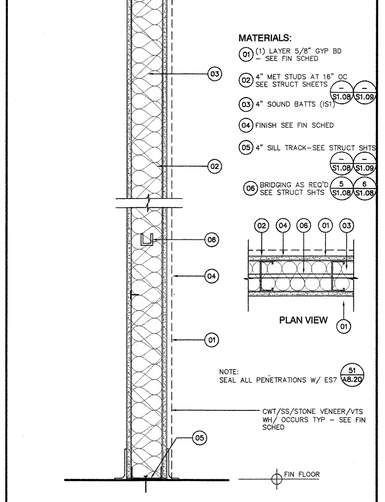
24 W4 - EXT. 6" METAL STUDS W/ ALUM CLADDING : 1 1/2"



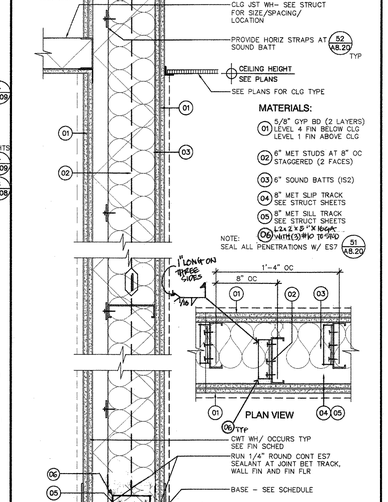
25 W5 - 6" METAL STUD FULL HEIGHT ONE HOUR : 1 1/2"



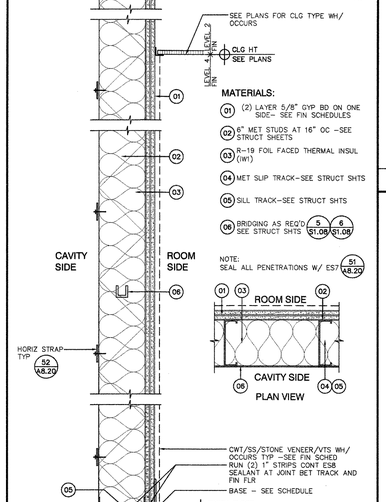
26 W6 - 6" METAL STUD (FULL HT) : 1 1/2"



41 W7 - 4" INT WALL PARTITION (CLG HT) : 1 1/2"



42 W8 - 6" STAGGERED METAL STUD (FULL HT) : 1 1/2"

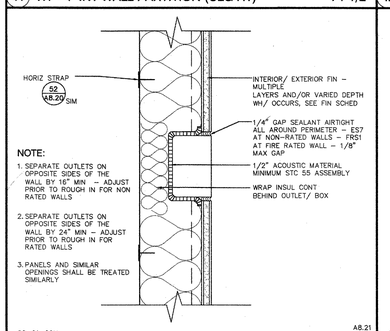


43 W9 - 6" METAL STUD (FULL HT) : 1 1/2"

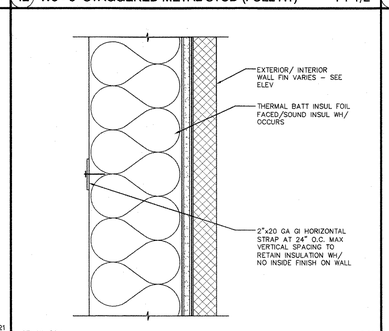
44 NOT USED : 1 1/2"

45 NOT USED

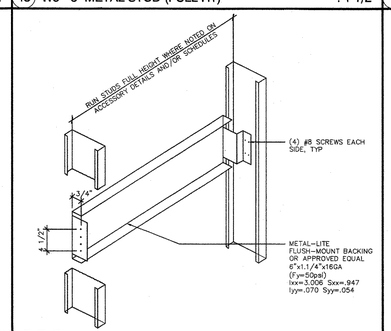
46 NOT USED



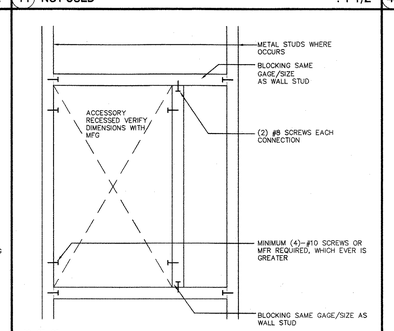
51 TYP OUTLET TREATMENT AT WALLS : 3"



52 TYP INSULATION DETAIL : 3"



53 TYPICAL FLUSH MOUNT BACKING : NTS



54 TYP ACC BACKING DETAIL RECESSED MTD : 1 1/2"

55 NOT USED

56 NOT USED

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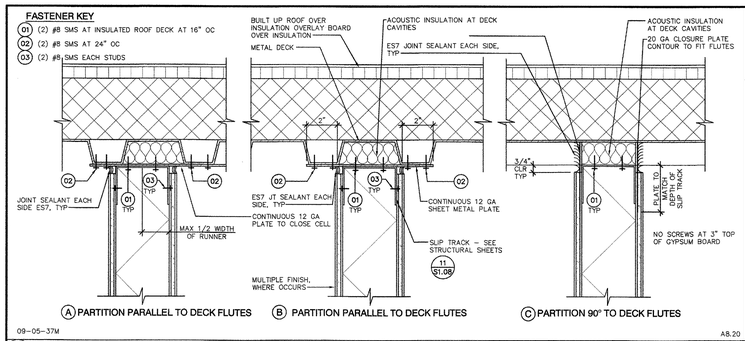
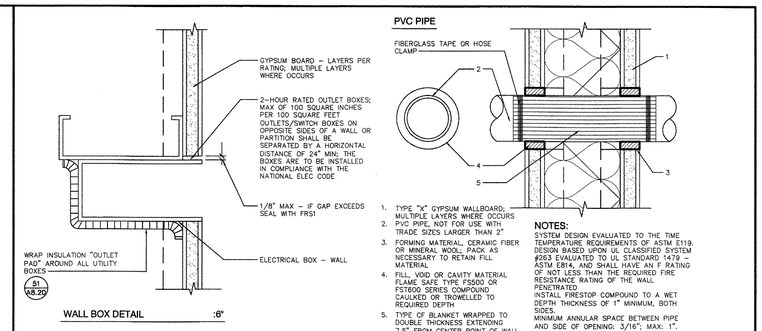


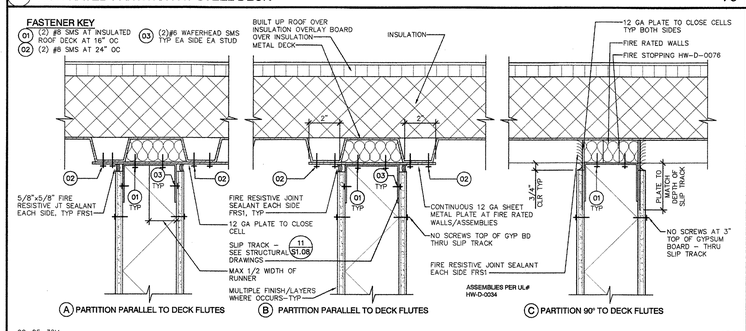
09-05-37M A8.20

11 NON-RATED PARTITION AT STEEL DECK : 3"

13 NOT USED

14 NOT USED



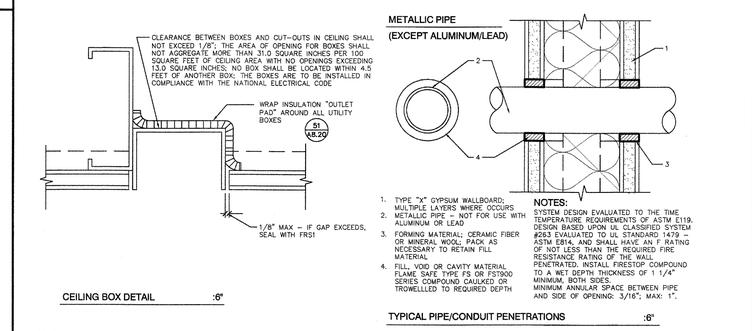


09-05-36M A8.20

21 FIRE RATED PARTITION AT STEEL DECK : 3"

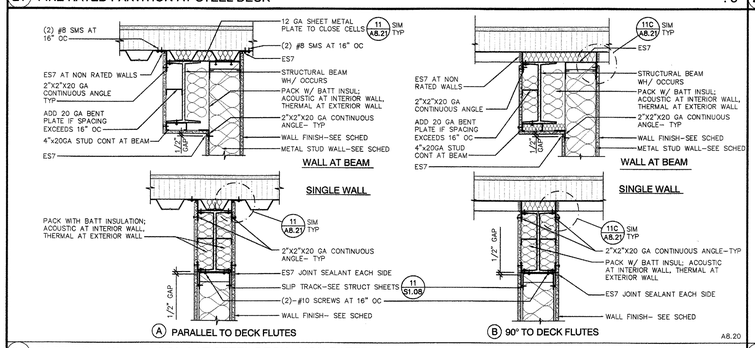
23 NOT USED

24 NOT USED



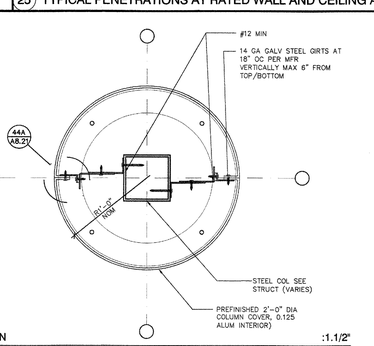
09-06-01M A8.20

25 TYPICAL PENETRATIONS AT RATED WALL AND CEILING ASSEMBLIES : AS NOTED



31 PARTITION WALL AT BEAM AT STEEL DECK - NON RATED : 1"

33 NOT USED



A2.20

36 NOT USED

41 PARTITION WALL AT BEAM AT STEEL DECK - FIRE RATED : 1"

43 NOT USED

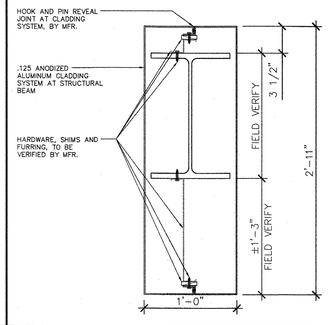
A2.20

44 METAL COLUMN COVER :AS NOTED

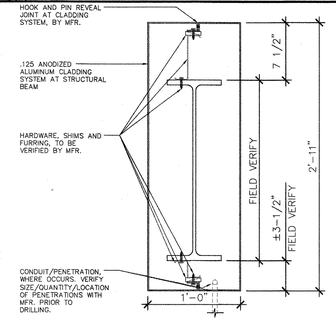
46 COLUMN CLADDING : 1 1/2"

51 NOT USED

52 NOT USED

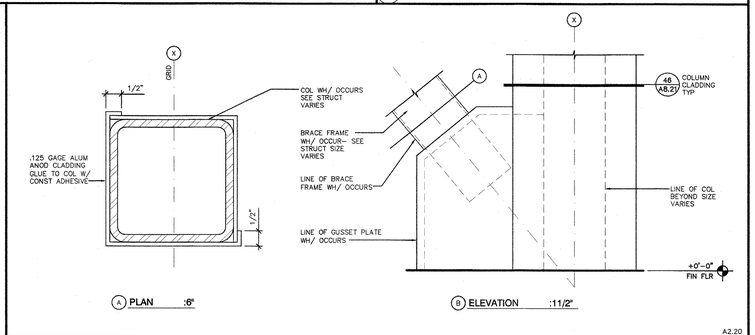


53 METAL BEAM COVER :AS NOTED



A2.20

55 ALUM CLAD BRACE FRAME/COLUMN : AS NOTED



A2.20

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West Kern Community College District

FOR PLAN REVIEW ONLY

ARCHITECT

LICENSED ARCHITECT KEVIN COBB C-26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15 - C2
APP. NO. 03 - 115449
AC FLS SS
DATE SEP 16 2015

PROJECT INFO

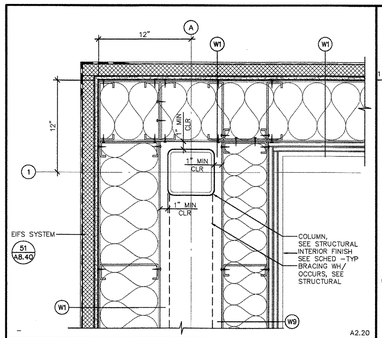
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	11.08.2014

REVISIONS

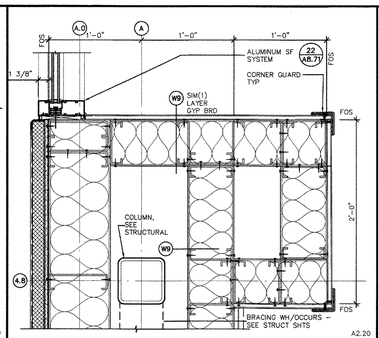
No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.21



11 WALL DETAIL :1 1/2"



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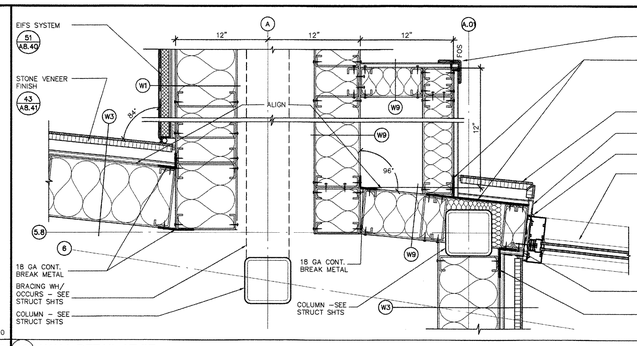

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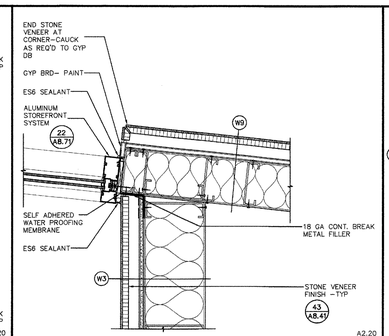

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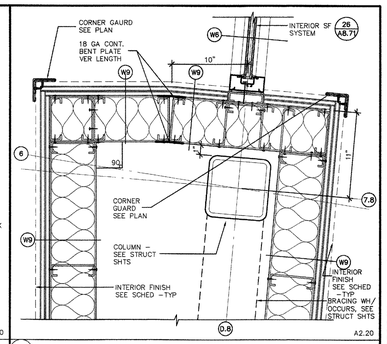

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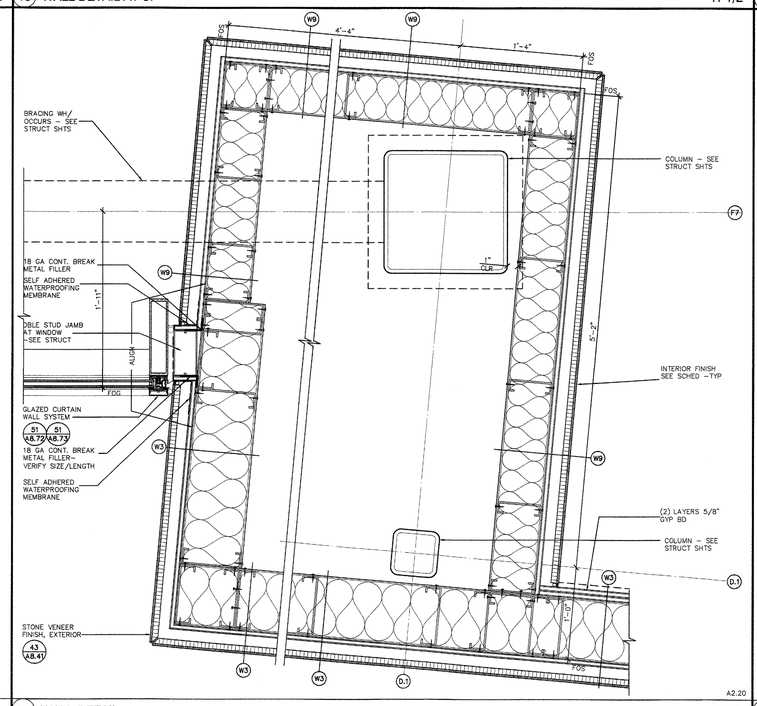

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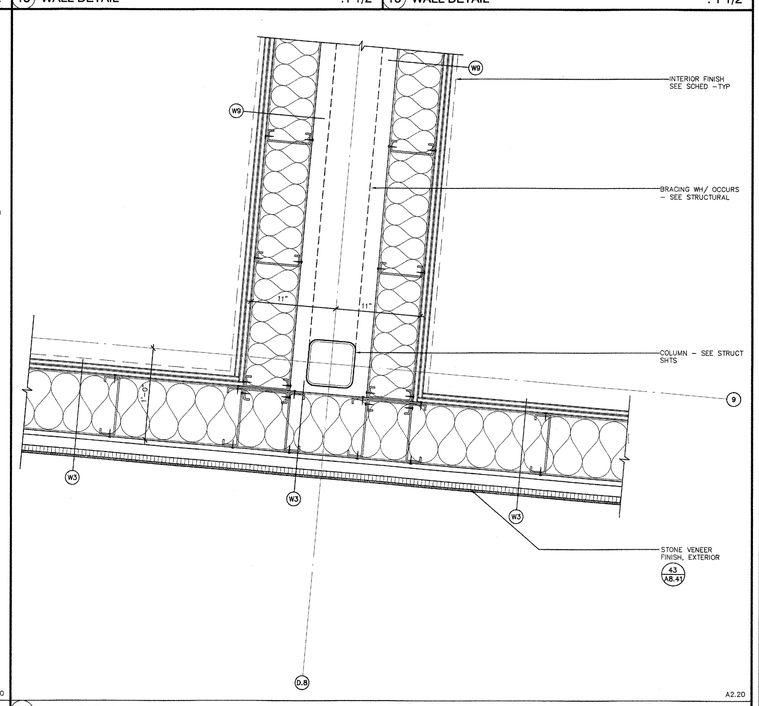

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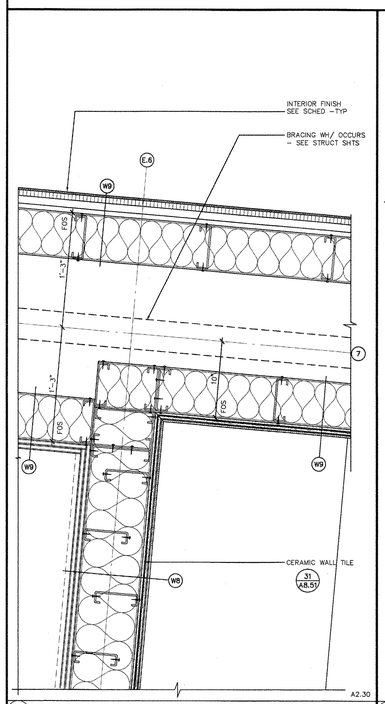

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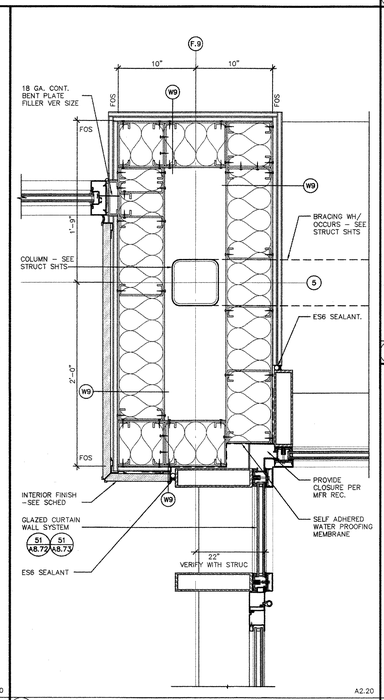

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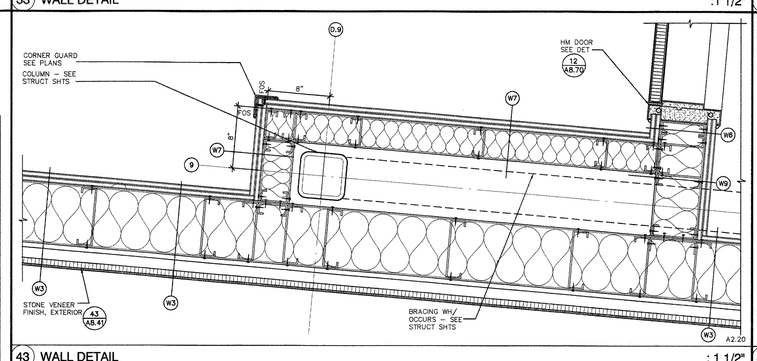

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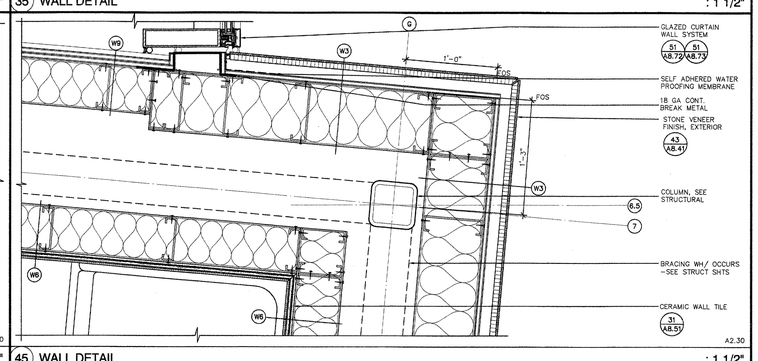

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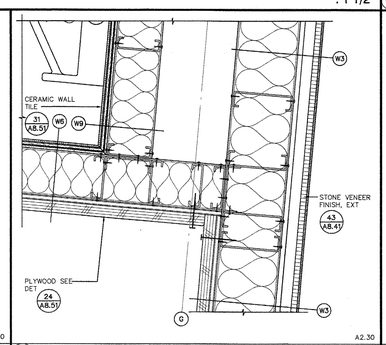
53 WALL DETAIL : 1 1/2"



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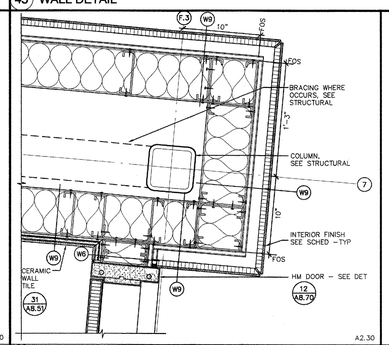

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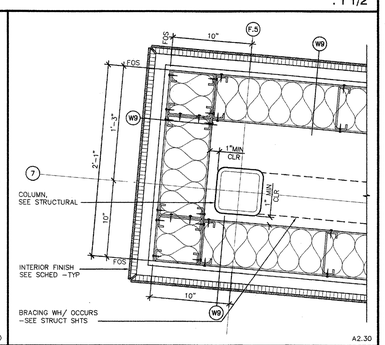

56 WALL DETAIL : 1 1/2"

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DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACTION FIS SS 6mo
DATE SEP 16 2015

PROJECT INFO

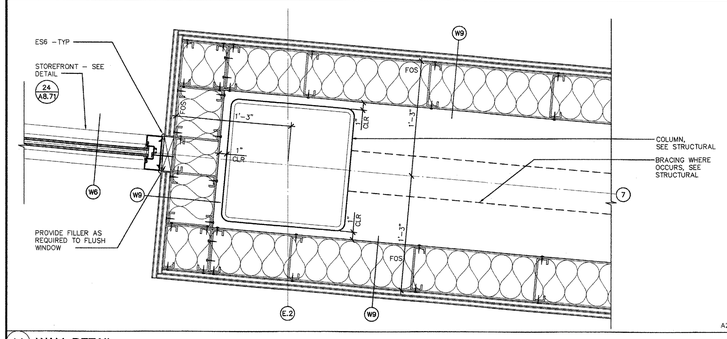
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.22



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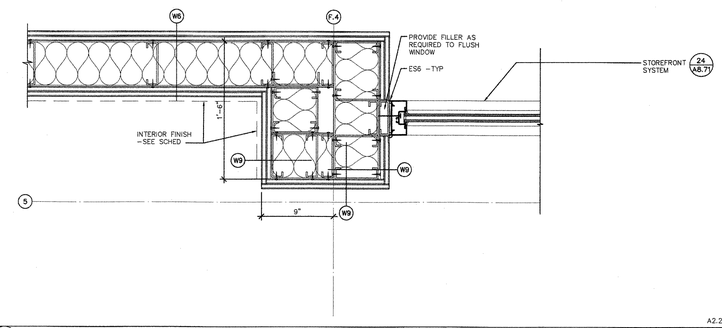

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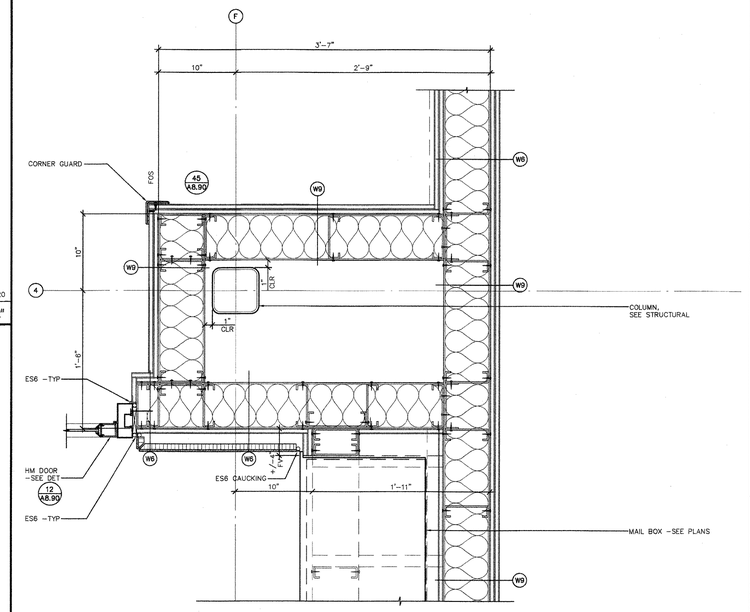

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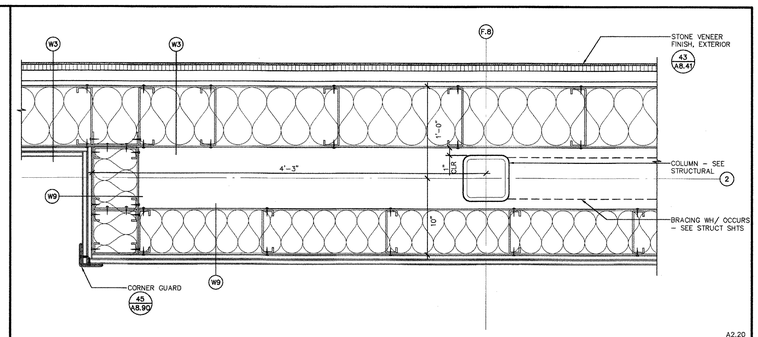

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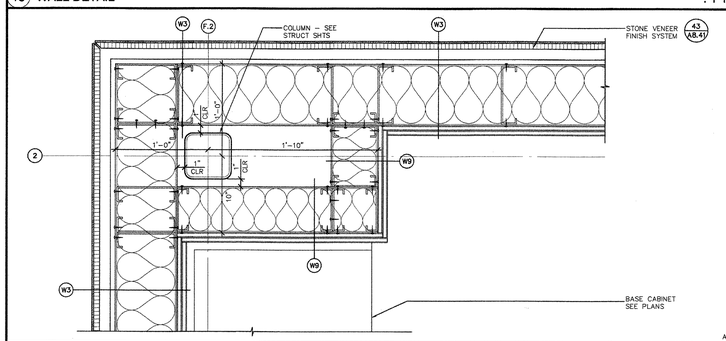

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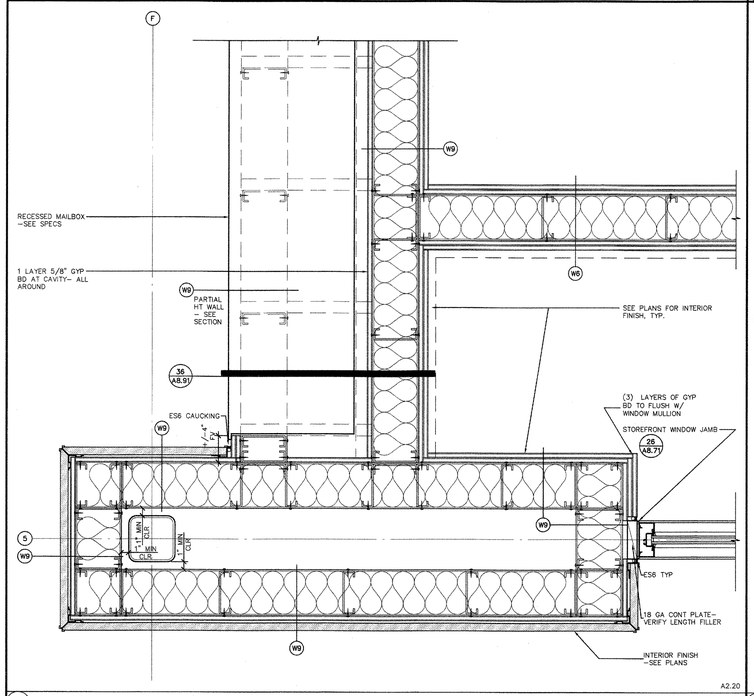

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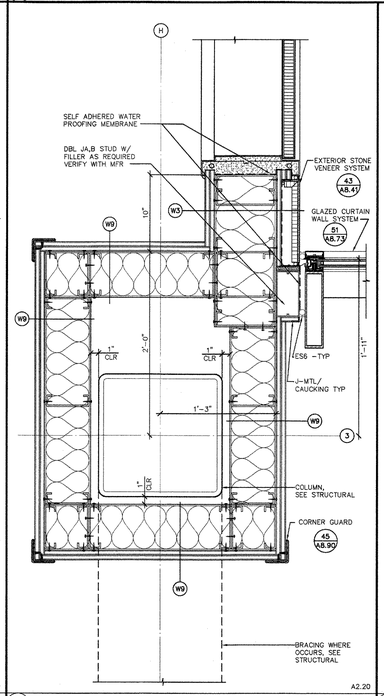

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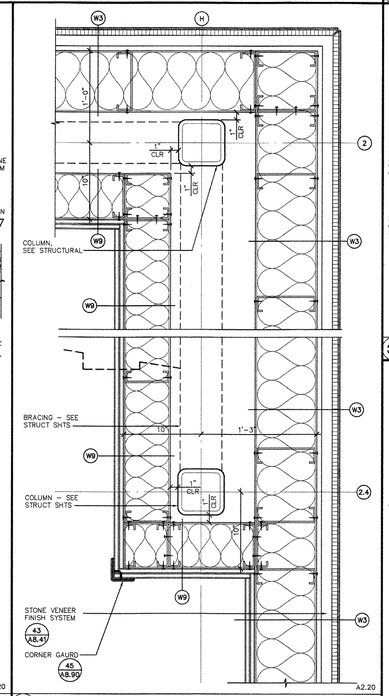

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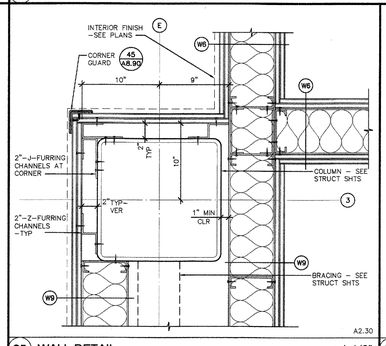

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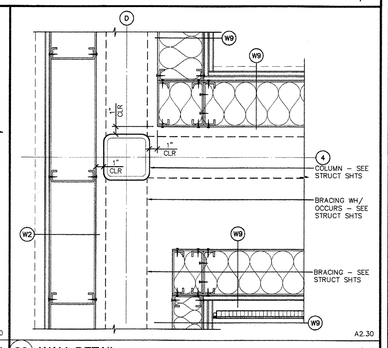

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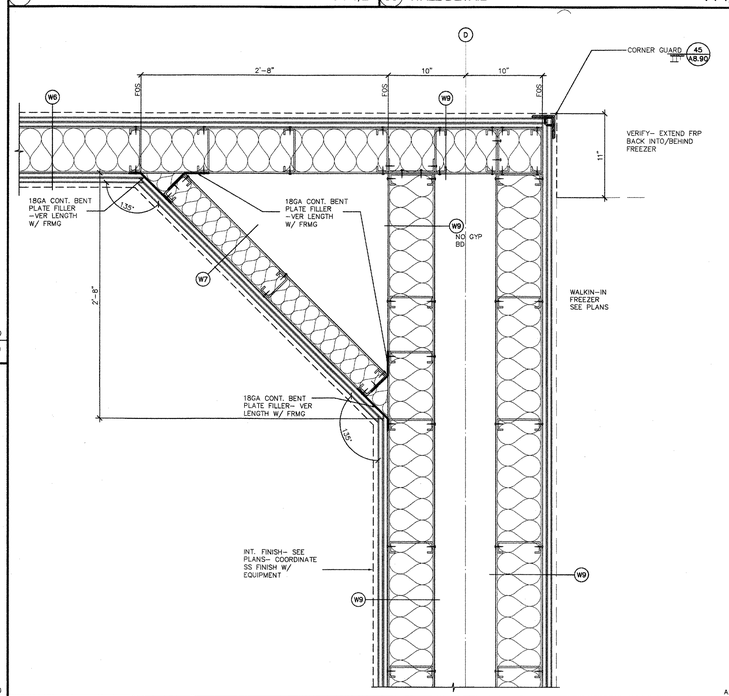

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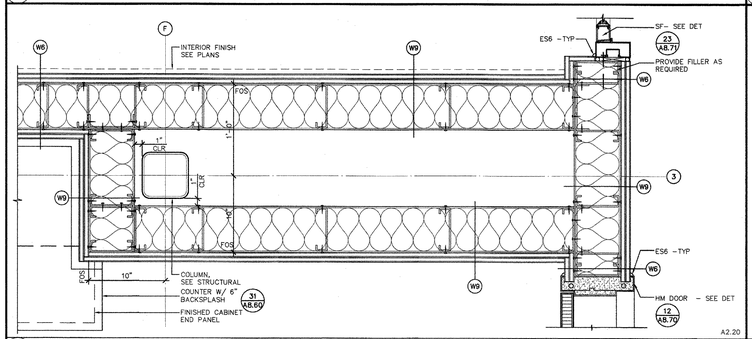

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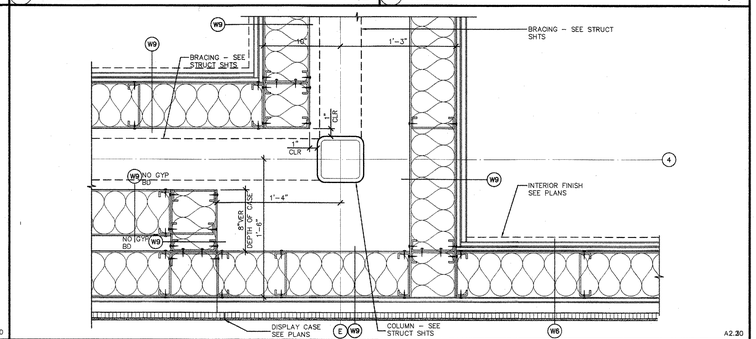

A2.30

53 WALL DETAIL : 1-1/2"

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IDENTIFICATION STAMP
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FILE NO. 15-C2
APP. NO. 03-115449
AC FLS SS
DATE SEP 16 2015

PROJECT INFO

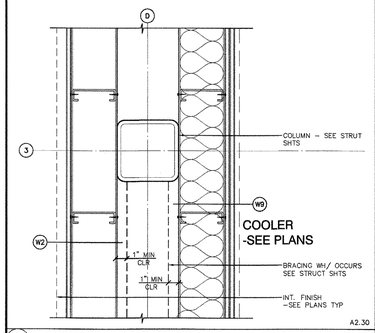
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.23



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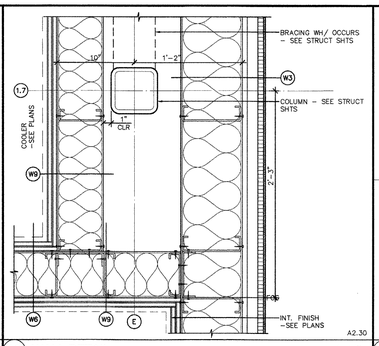

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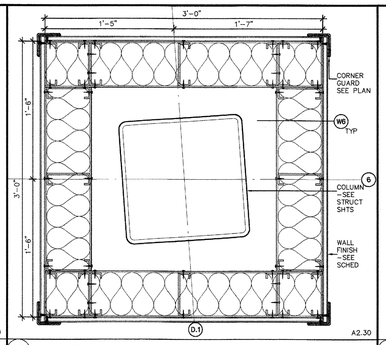

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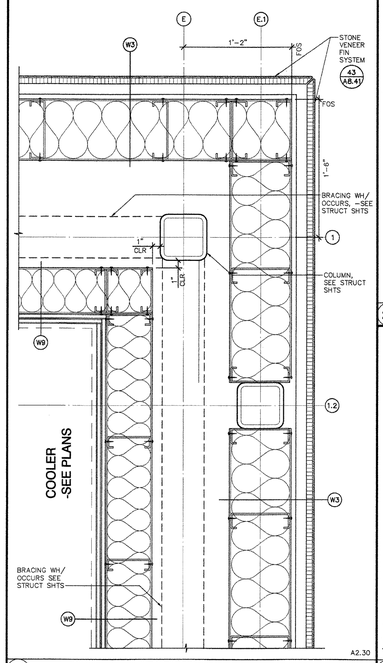
15 NOT USED

16 NOT USED



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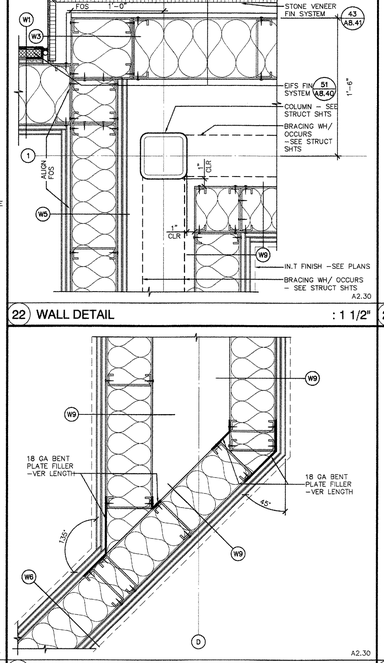

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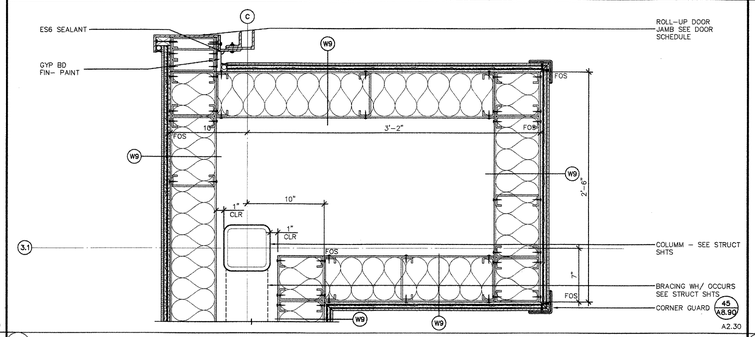

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26 NOT USED

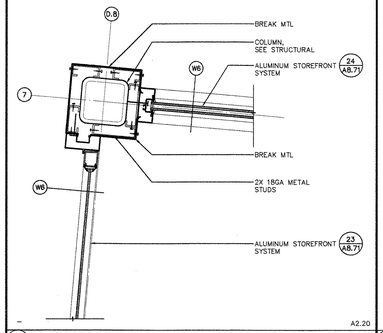
32 WALL DETAIL : 1 1/2"

33 WALL DETAIL : 1 1/2"

35 NOT USED

36 NOT USED

51 WALL DETAIL : 1 1/2"



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54 WALL DETAIL : 1 1/2"

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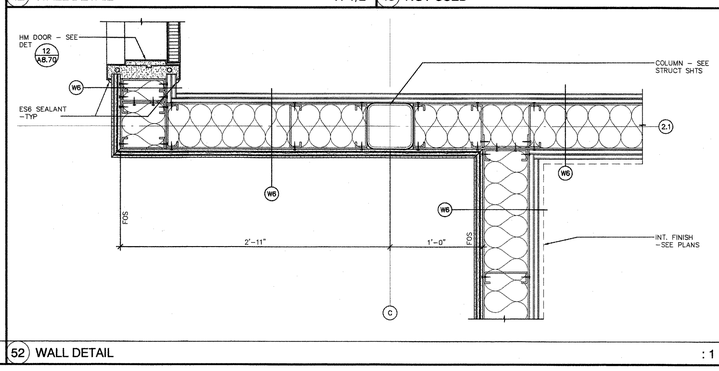

52 WALL DETAIL : 1 1/2"

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PROJECT INFO

Project No	430–0044
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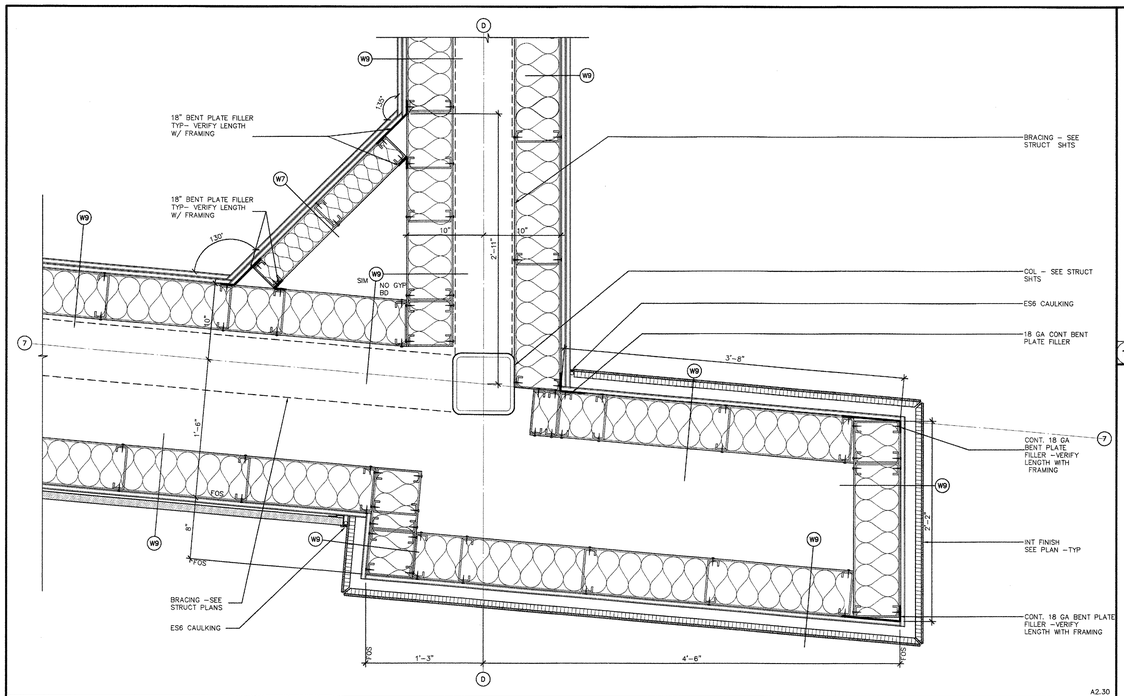
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.24



A2.30

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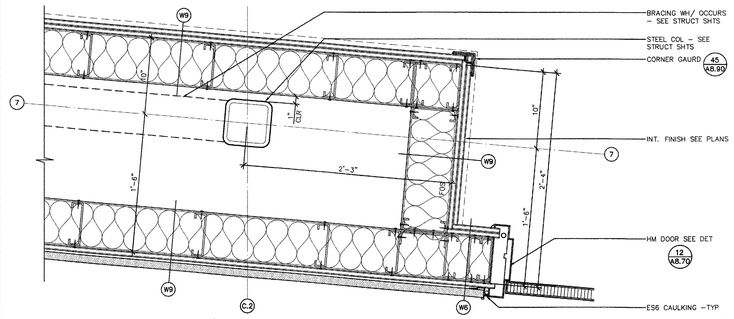

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14 WALL DETAIL : 1 1/2"

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25 NOT USED

26 NOT USED

31 NOT USED

32 NOT USED

33 NOT USED

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41 NOT USED

42 NOT USED

43 NOT USED

44 NOT USED

45 NOT USED

46 NOT USED

51 NOT USED

52 NOT USED

53 NOT USED

54 NOT USED

55 NOT USED

56 NOT USED

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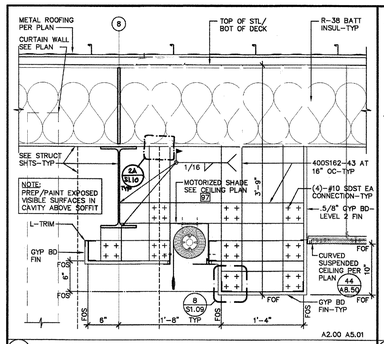
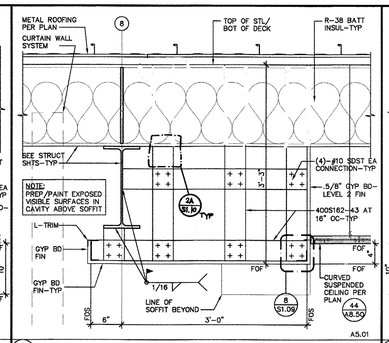
A8.25



11 CURVED SOFFIT W/ MOTORIZED SHADE - GRIDLINE 8 : 1"



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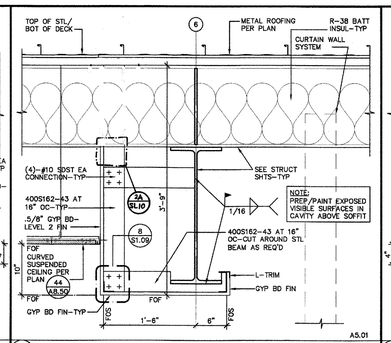

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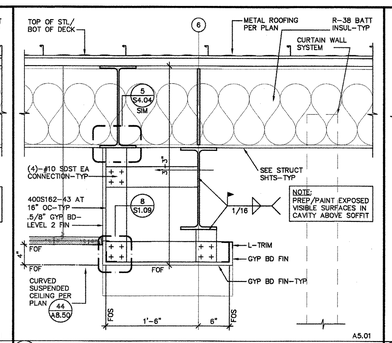
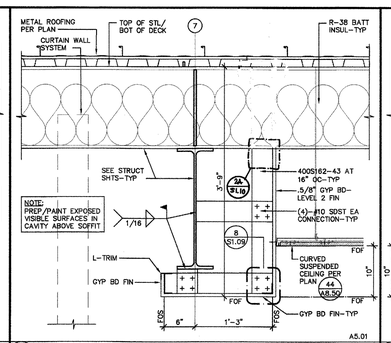


14 CURVED SOFFIT AT W16 - GRIDLINE 6 : 1"



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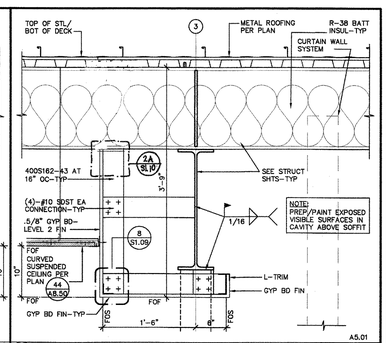
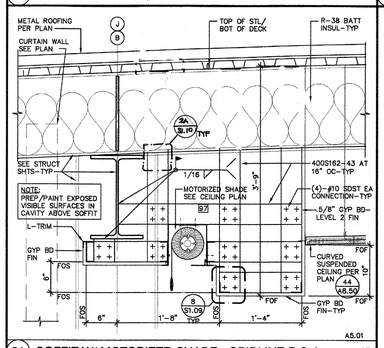
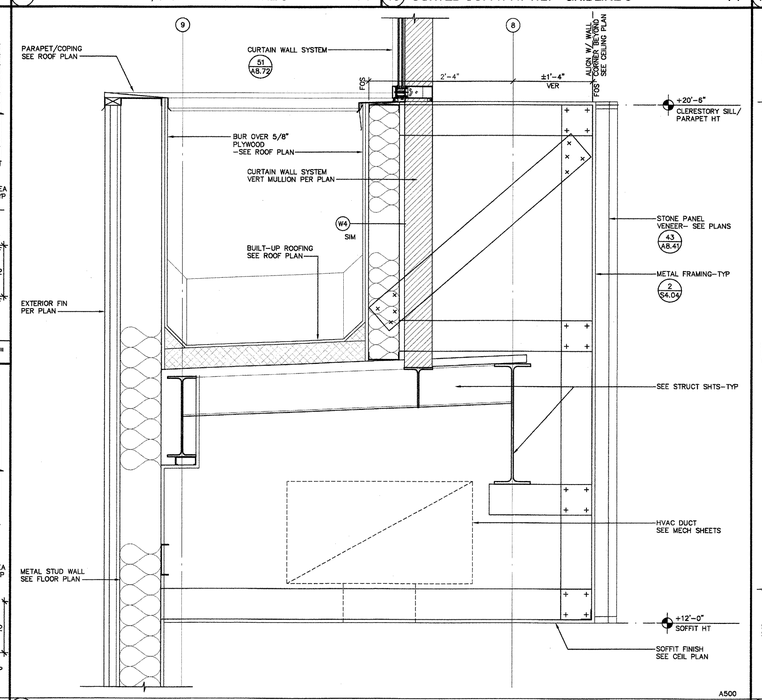


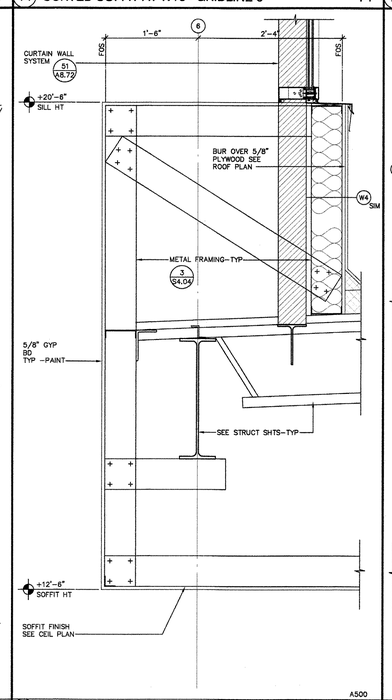
16 CURVED SOFFIT - GRIDLINE 3 : 1"



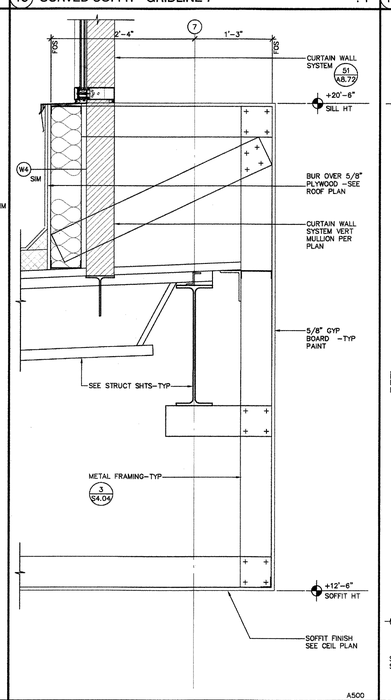
21 SOFFIT W/ MOTORIZED SHADE - GRIDLINE B & J : 1"



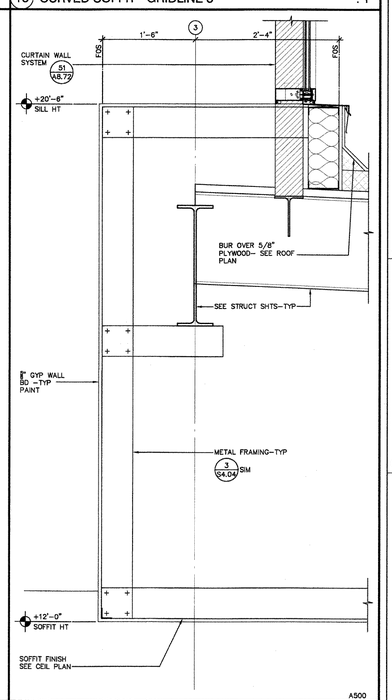
32 SOFFIT AT CLERESTORY SILL - GRIDLINE 8 & 9 : 1"



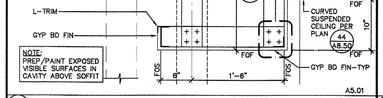
34 SOFFIT AT CLERESTORY SILL - GRIDLINE 6 : 1"



35 SOFFIT AT CLERESTORY SILL - GRIDLINE 7 : 1"



36 SOFFIT AT CLERESTORY SILL - GRIDLINE 3 : 1"



31 SOFFIT - GRIDLINE 5 : 1"

41 NOT USED

42 NOT USED

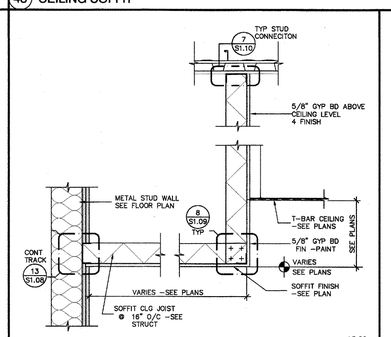
43 CEILING SOFFIT : 1"

45 SOFFIT AT SF - GRIDLINE 6 : 1"

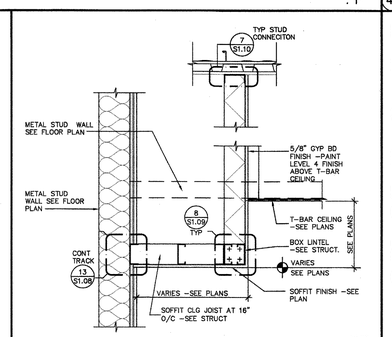
56 SOFFIT - GRIDLINE A : 1"

51 NOT USED

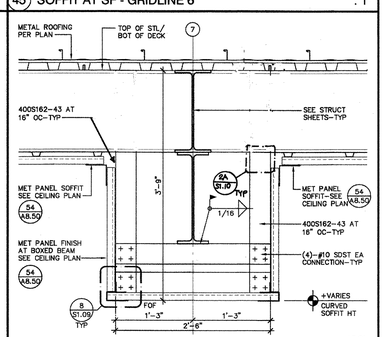
52 NOT USED



53 TYPICAL SOFFIT DETAIL : 1"



54 TYPICAL SOFFIT DETAIL : 1"



55 EXTERIOR SOFFIT - GRIDLINE 7 : 1"

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PROJECT INFO

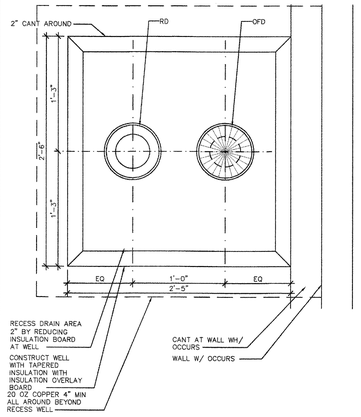
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

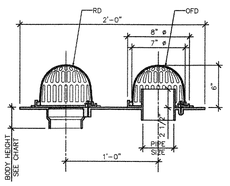
No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.26



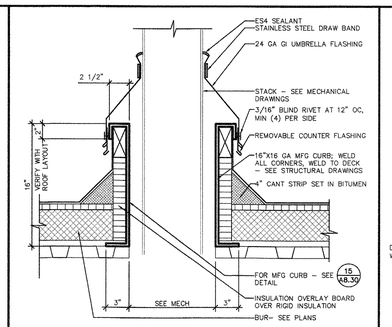
PLAN



SECTION

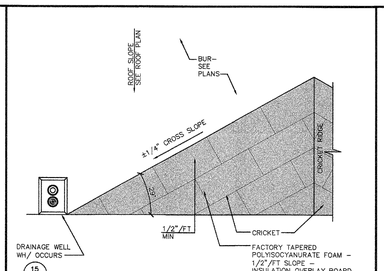
07-01-03M A3.00

21 COMBINED RD AND OVERFLOW SYSTEM : 1 1/2"



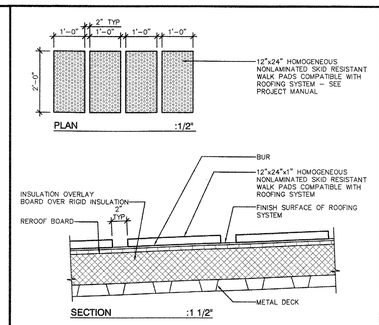
07-02-06 A3.00

12 TYPICAL STACK FLASHING : 1 1/2"



07-15-01 A3.00

13 ROOF CRICKET : 1/4"

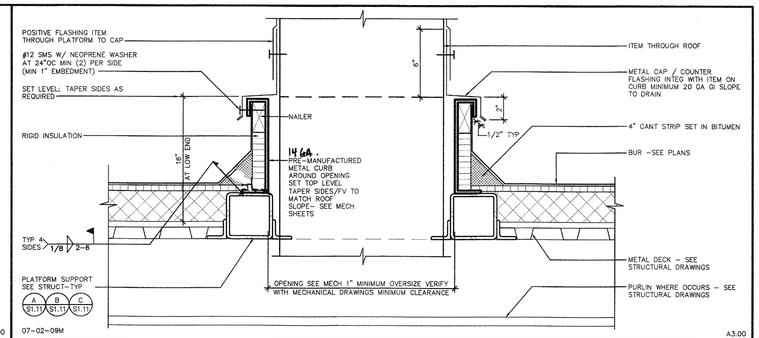


PLAN :1/2"

SECTION :1 1/2"

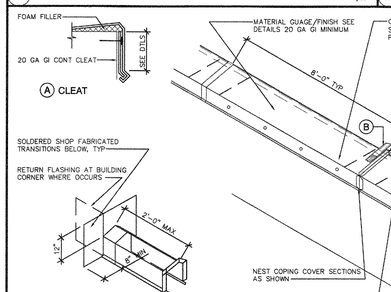
07-07-05 A3.00

14 WALK PADS AT ROOF : AS NOTED



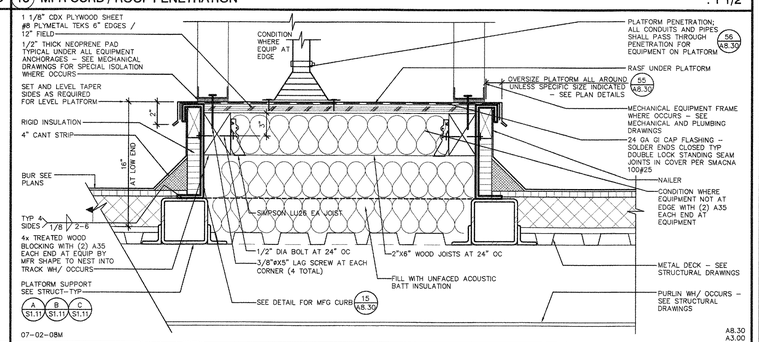
07-02-09M A3.00

15 MFR CURB / ROOF PENETRATION : 1 1/2"



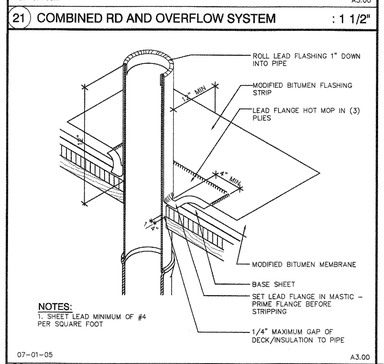
A8.30
A8.31
A3.00

24 NOT USED : 1 1/2"



07-02-08M A8.30 A3.00

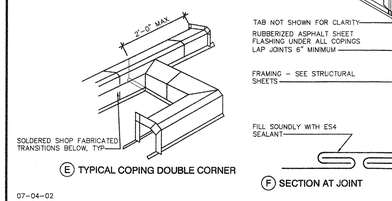
25 PLATFORM AT ROOF : 1.1/2"



NOTES:
1. SHEET LEAD MINIMUM OF #4 PER SQUARE FOOT

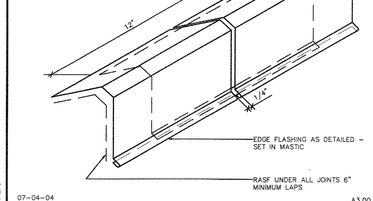
07-01-05 A3.00

31 TYPICAL PENETRATION VENT PIPE FLASHING : NTS



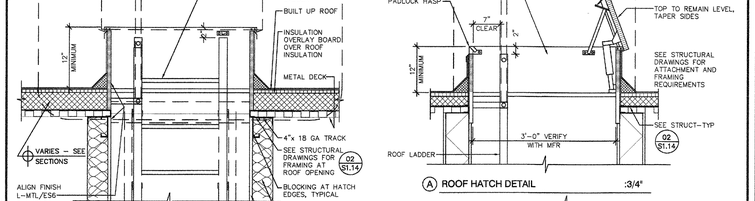
07-04-02 A3.00

32 METAL COPING DETAILS : NTS



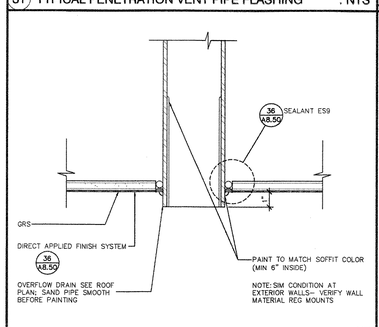
07-04-04 A3.00

34 TYPICAL SHEET METAL EXPANSION JOINT : 3"



A5.00
A3.00
A2.20

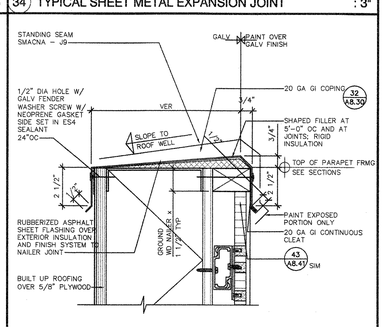
45 ROOF SCUTTLE/HATCH : AS NOTED



07-04-03M A8.20 A3.00

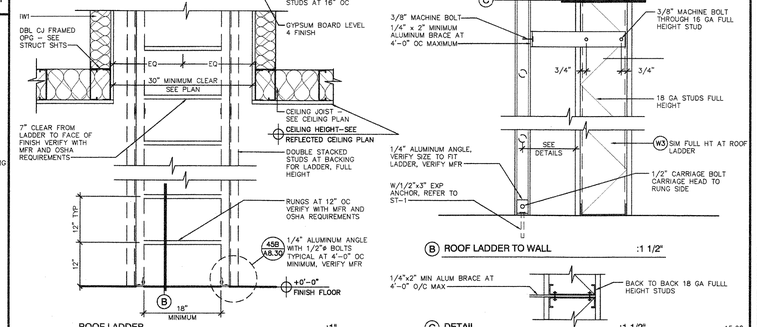
42 TYPICAL COPING DETAIL AT EIFS : 3"

43 NOT USED



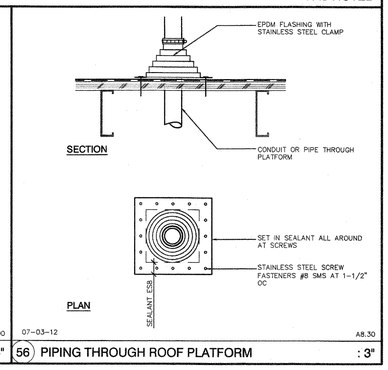
07-04-03M A8.20 A3.00

44 TYPICAL COPING DETAIL AT STONE VENEER : 3"



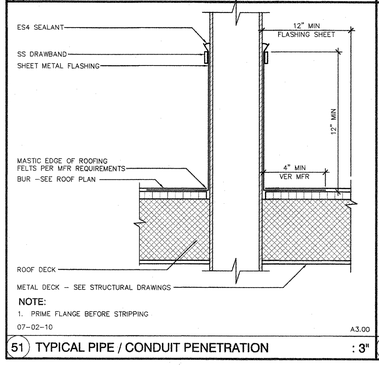
07-02-07M A3.00

55 PLATFORM PLAN - TYPICAL : 3/4"



07-03-12 A8.30

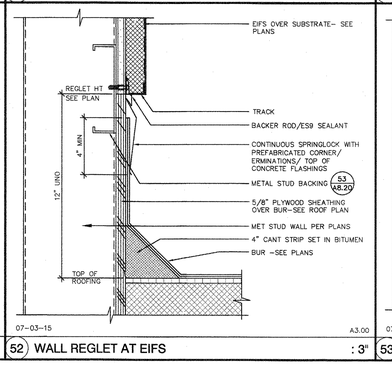
56 PIPING THROUGH ROOF PLATFORM : 3"



NOTE:
1. PRIME FLANGE BEFORE STRIPPING

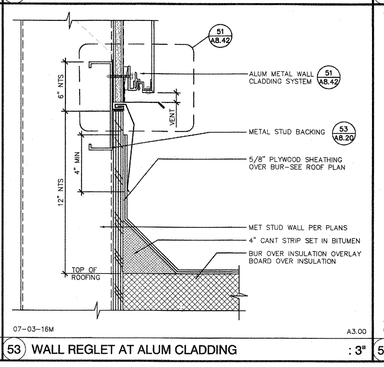
07-02-10 A3.00

51 TYPICAL PIPE / CONDUIT PENETRATION : 3"



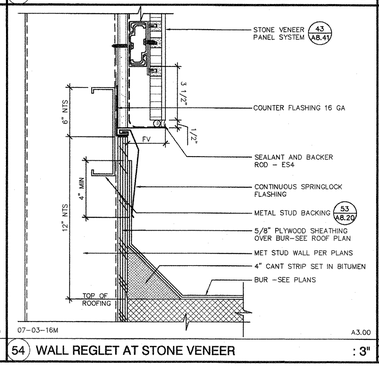
07-03-15 A3.00

52 WALL REGLET AT EIFS : 3"



07-03-16M A3.00

53 WALL REGLET AT ALUM CLADDING : 3"



07-03-16M A3.00

54 WALL REGLET AT STONE VENEER : 3"

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PROJECT INFO

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Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
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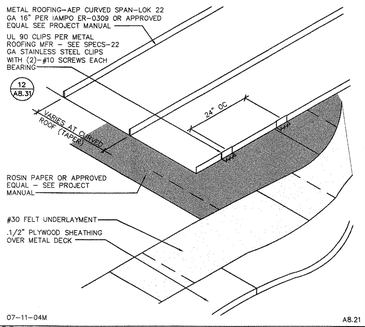
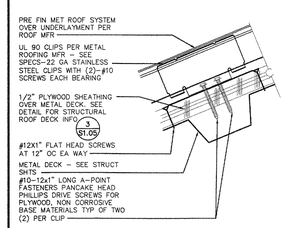
DETAILS

A8.30



07-11-04M A8.21

11 TYPICAL METAL ROOF : NTS

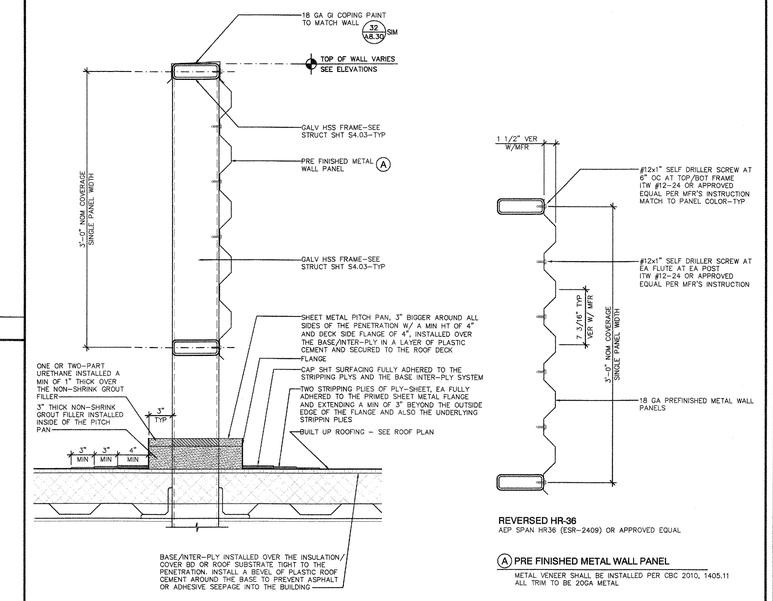


NOTE:
METAL ROOFING-AEP CURVED SPAN-LOK 16" PER IAMPO ER-0309 OR APPROVED EQUAL SEE PROJECT MANUAL

12 METAL ROOF SECTION : NTS

13 NOT USED

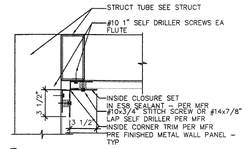
14 NOT USED



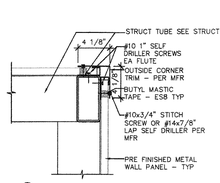
REVERSED HR-36
AEP SPAN HR36 (ESR-2409) OR APPROVED EQUAL

A PRE FINISHED METAL WALL PANEL
METAL VENEER SHALL BE INSTALLED PER CBC 2010, 1405.11
ALL TRIM TO BE 20GA METAL

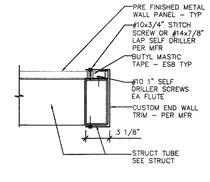
METAL PANEL PROPERTIES								
GAUGE	THK	YIELD	TENSILE	WT	I+	S+	I-	S-
18 GA	0.0459	40 KSI	55 KSI	2.5 LBS/FT²	0.2456 IN⁴/FT	0.3107 IN³/FT	0.2500 IN⁴/FT	0.2947 IN³/FT



B TYP INSIDE CORNER



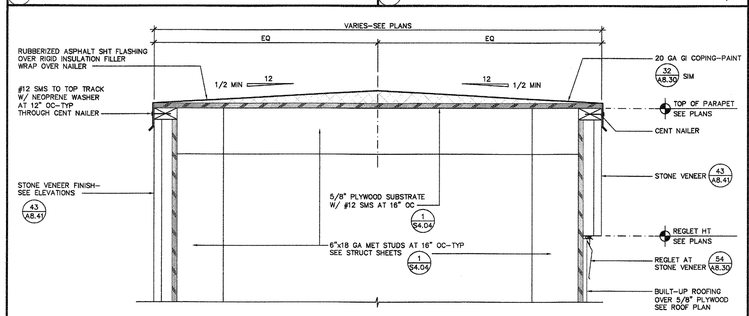
C TYP OUTSIDE CORNER



D TYP PANEL END CONDITION

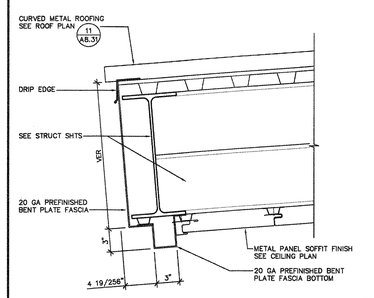
A4.00
A3.00

35 PRE-FINISHED METAL SCREEN WALL : 1 1/2"



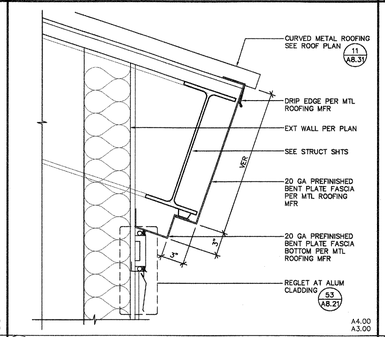
A3.00

31 PYLON AT PARAPET : 1.1/2"



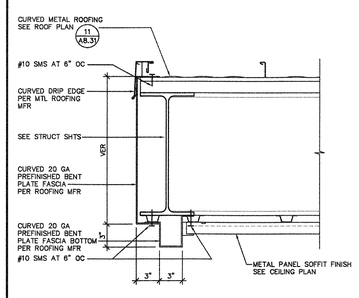
A4.00
A3.00

22 METAL ROOF FASCIA AT HIGH ENDS : 1 1/2"



A4.00
A3.00

23 METAL ROOF FASCIA AT LOW ENDS : 1 1/2"



A4.00
A3.00

24 METAL ROOF FASCIA AT CURVED SIDES : 1 1/2"

21 NOT USED

41 NOT USED

42 NOT USED

43 NOT USED

44 NOT USED

45 NOT USED

46 NOT USED

51 NOT USED

52 NOT USED

53 NOT USED

54 NOT USED

55 NOT USED

56 NOT USED

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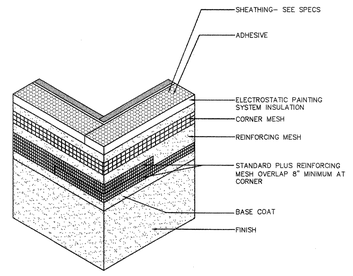
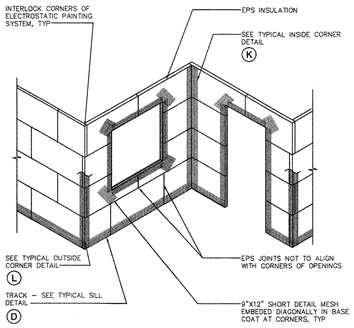
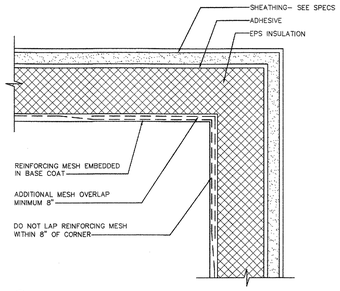


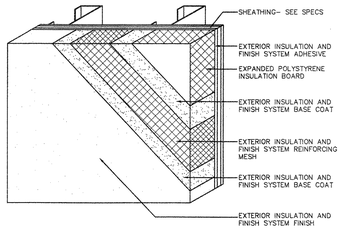
Ⓐ TYP CORNER : ISO



Ⓕ TYP PENETRATIONS/MESH APPLICATION : NTS



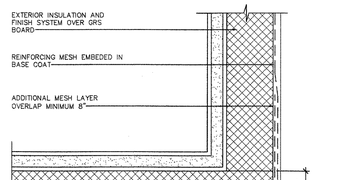
Ⓚ TYP EIFS INSIDE CORNER DETAIL : 6"



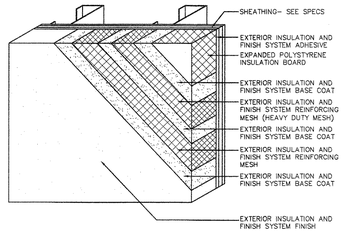
Ⓑ TYP EIFS : ISO

Ⓖ NOT USED

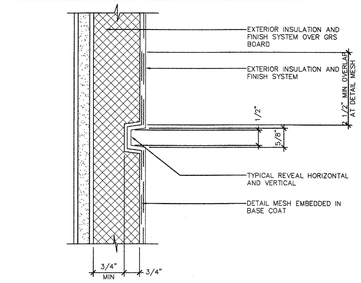
NOTE- EIFS SYSTEM TO BE "STOTHERM EIFS" INSTALLED PER ESR-1720 OR APPROVED EQUAL.



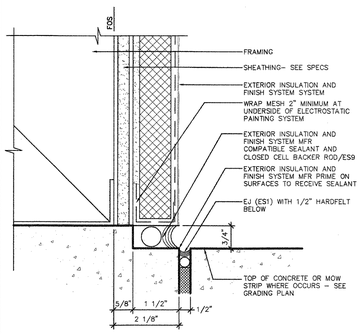
Ⓛ TYP EIFS OUTSIDE CORNER DETAIL : 6"



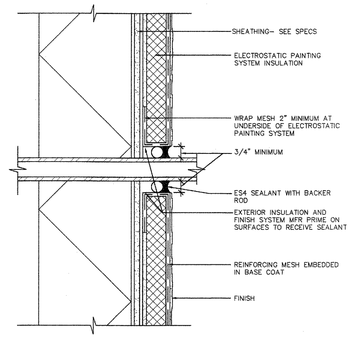
Ⓒ TYP HD EIFS : ISO



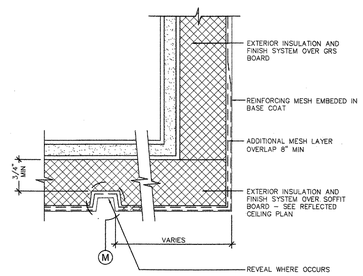
Ⓜ EIFS REVEAL HORIZ / VERT : 6"



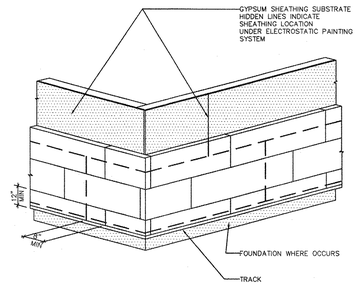
Ⓓ TYP EIFS SILL : 6"



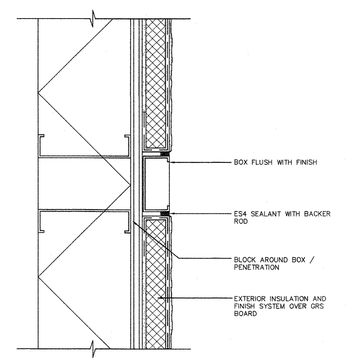
Ⓗ TYP PIPE/CONDUIT PENETRATION : 3"



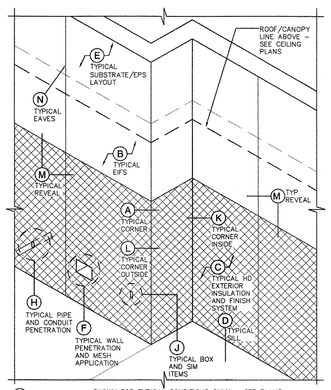
Ⓝ EIFS EAVE SECTION : 6"



Ⓔ TYP SUBSTRATE/EPS LAYOUT : NTS



Ⓙ TYP PENETRATION - BOX, SIM ITEMS : 3"



Ⓟ KEY ELEV SHOWN FOR TYPICAL CONDITIONS ONLY – SEE PLANS AND ELEVATIONS FOR APPLICABLE LOCATIONS : ISO

8.20
8.22
A8.20
A4.00

07-08-01

51 TYPICAL EXTERIOR INSULATION AND FINISH SYSTEM : AS NOTED

14 NOT USED | 15 NOT USED | 16 NOT USED

24 NOT USED | 25 NOT USED | 26 NOT USED

34 NOT USED | 35 NOT USED | 36 NOT USED

44 NOT USED | 45 NOT USED | 46 NOT USED

54 NOT USED | 55 NOT USED | 56 NOT USED

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D S A

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACT. FLS SS
DATE SEP 16 2015

PROJECT INFO

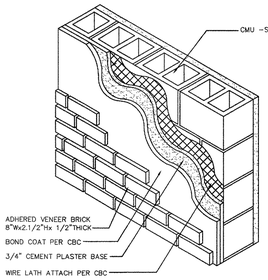
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

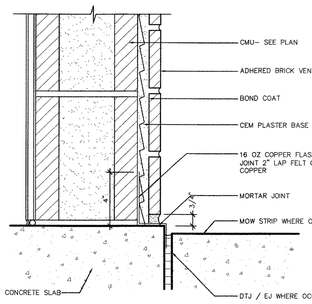
No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

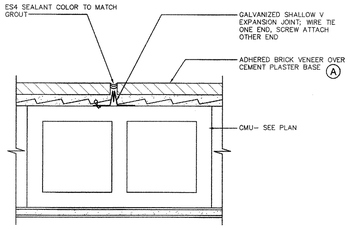
A8.40



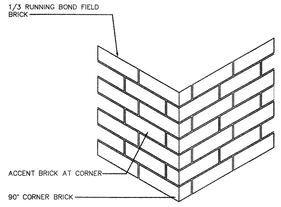
(A) TYP ADHERED BRICK VENEER : ISO



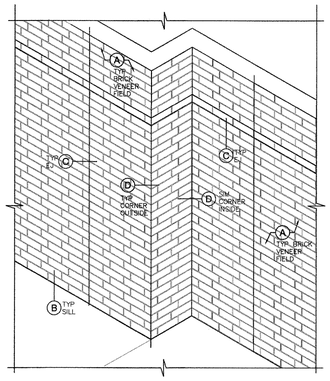
(B) TYP SILL : 3"



(C) EJ - VERT (HORIZ SIM) : 3"



(D) TYP OUTSIDE CORNER (INSIDE SIM) : ISO



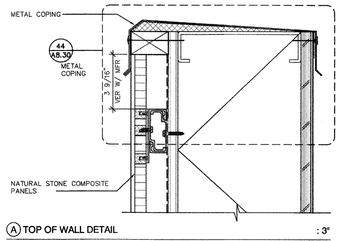
(E) KEY ELEV SHOWN FOR TYPICAL CONDITIONS ONLY – SEE PLANS AND ELEVATIONS FOR ACTUAL LOCATIONS AND DIMENSIONS : ISO

09-08-01 A7.10

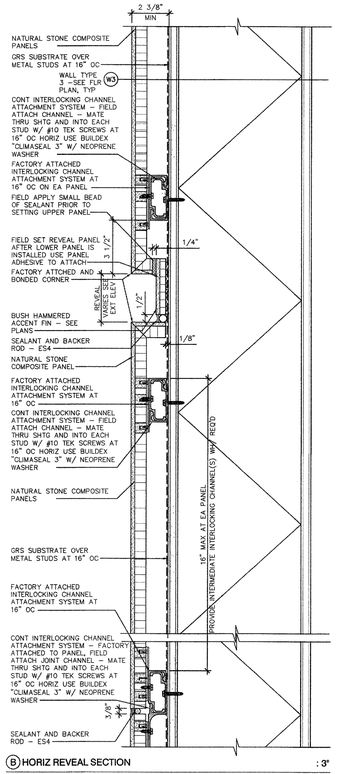
31 TYPICAL ADHERED BRICK VENEER : AS NOTED

41 NOT USED

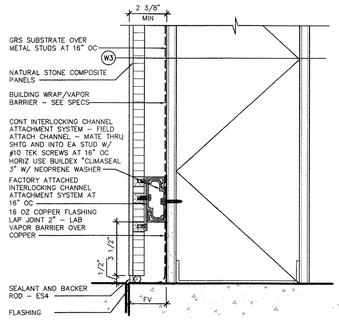
42 NOT USED



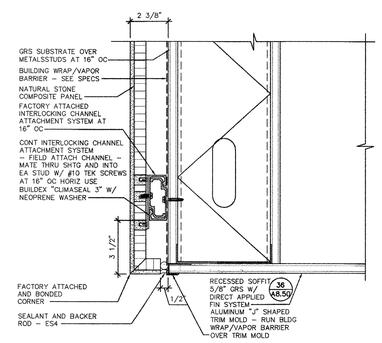
(A) TOP OF WALL DETAIL : 3"



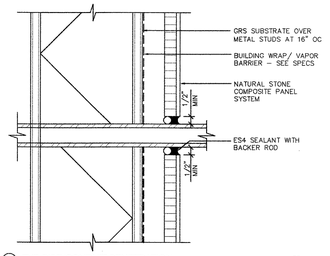
(B) HORIZ REVEAL SECTION : 3"



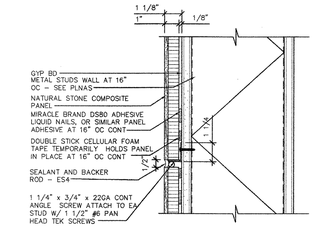
(C) BOTTOM OF WALL/SILL : 3"



(D) STONE PANEL RETURN AT RECESSED SOFFIT : 3"

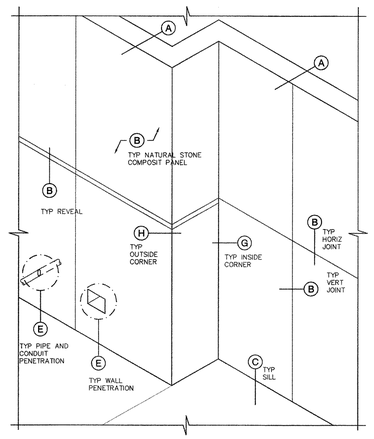


(E) TYP PIPE/CONDUIT PENETRATION : 3"



(F) INT ADHESIVE ATTACHMENT OVER GYP BD : 3"

NOTES:
1. STONE VENEER COMPOSITE PANEL SYSTEM TO BE "STONELITE" INSTALLED PER ESR-1500 OR APPROVED EQUAL.
2. COMPOSITE PANEL WEIGHT TO BE 4 PSF MAX.
3. OUT-OF-PLANE DEFLECTION OF SUPPORTING WALL TO BE L/240 MAX.
4. PROVIDE CHANNEL WITH CAPACITY OF 44 PSF WIND LOAD.
CONTINUOUS INTERLOCKING CHANNEL TO BE 1-7/8" W x 2-3/4" H x .094" MIN., EXTRUDED ALUMINUM.



(*) KEY ELEV SHOWN FOR TYPICAL CONDITIONS ONLY – SEE PLANS AND ELEVATIONS FOR APPLICABLE LOCATIONS : ISO

A8.20
A4.00
A8.22

43 STONE VENEER COMPOSITE PANEL SYSTEM :AS NOTED

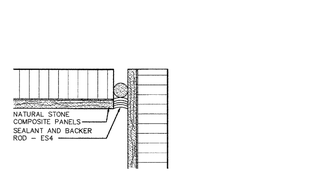
51 NOT USED

52 NOT USED

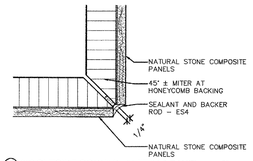
53 NOT USED

54 NOT USED

55 NOT USED



(G) INSIDE CORNER : 6"



(H) 90° OUTSIDE CORNER - MITERED PANEL : 6"

16 NOT USED

26 NOT USED

36 NOT USED

46 NOT USED

56 NOT USED

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AC FLS 6S
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Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.41

11 NOT USED

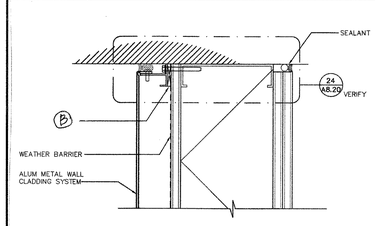
12 NOT USED

13 NOT USED

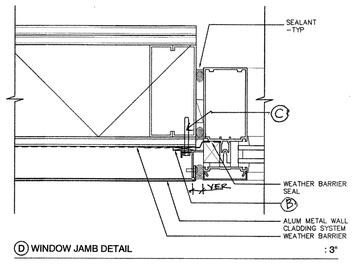
14 NOT USED

15 NOT USED

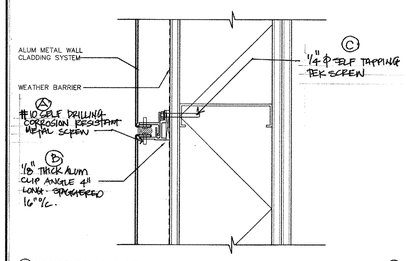
16 NOT USED



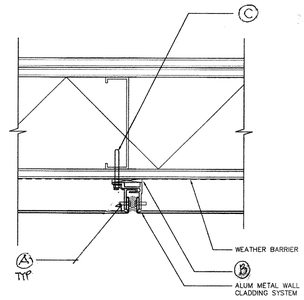
A HEAD WALL CONDITION - TYP : 3"



D WINDOW JAMB DETAIL : 3"



B HORIZONTAL JOINT DETAIL - TYP : 3"



E VERTICAL JOINT DETAIL : 3"

17 NOT USED

18 NOT USED

19 NOT USED

20 NOT USED

21 NOT USED

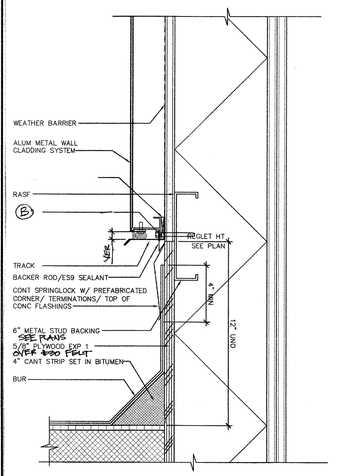
22 NOT USED

23 NOT USED

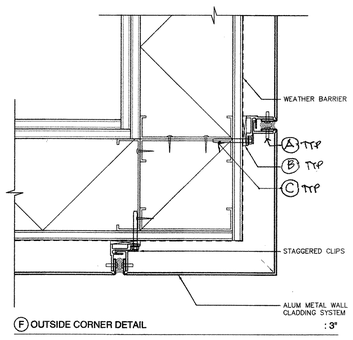
24 NOT USED

25 NOT USED

26 NOT USED



C BASE CONDITION - TYP : 3"



F OUTSIDE CORNER DETAIL : 3"

27 NOT USED

28 NOT USED

29 NOT USED

30 NOT USED

31 NOT USED

32 NOT USED

33 NOT USED

34 NOT USED

35 NOT USED

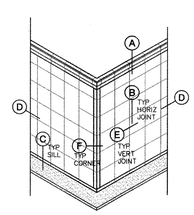
36 NOT USED

Ⓐ #10 SELF DRILLING CORROSION RESISTANT METAL SCREW PER ESR-3704

Ⓑ 1/8" THICK ALUM CLIP ANGLE - 4" LONG - STAGGERED 16" o/c

Ⓒ 1/4" ø SELF TAPPING TEK SCREW PER ESR-3704

NOTES:
METAL WALL CLADDING SYSTEM TO BE "ALPOLIC PE" 3MM PANEL SYSTEM PER ESR-3704 OR APPROVED EQUAL.
SUBSTRUCTURE TO COMPLY WITH CLIPS DESIGNED FOR MAX TRANSVERSE LOAD OF 44 PSF POSITIVE OR NEGATIVE.



G KEY ELEV SHOWN FOR TYPICAL CONDITIONS ONLY – SEE PLANS AND ELEVATIONS FOR APPLICABLE LOCATIONS : ISO

A8.20
A4.00

37 NOT USED

38 NOT USED

39 NOT USED

40 NOT USED

41 NOT USED

42 NOT USED

43 NOT USED

44 NOT USED

45 NOT USED

46 NOT USED

51 ALUM METAL WALL CLADDING :AS NOTED

53 NOT USED

54 NOT USED

55 NOT USED

56 NOT USED

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Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.42

NOTE:
TUBING AND CONDUIT SHALL BUTT TIGHT AGAINST STRUCTURE

SEE STRUCT SHEETS FOR CONNECTIONS — 1 / S1.14

EMT – EXTEND TUBE TO BE TIGHT TO CEILING GRID AND STRUCTURE ABOVE THEN INSTALL BOLT TO SECURE ONE TUBE TO THE OTHER – SEE TABLE FOR CONDUIT SIZE BELOW

#12 GA VERT WIRE HANGER IN TUBING – LEVEL CEILING GRID PRIOR TO SETTING TUBE

(2) #12 SPLAY BRACING WIRES IN LINE WITH CROSS TEE

EMT/CONDUIT AT 90° TO RUNNER – SEE SCHEDULE, NOTCH BOTTOM 1" TO RECEIVE MAIN RUNNER

DRILL 3/32" HOLE AND INSTALL 1/8" BOLT AND LOCKING NUT

(2) #12 SPLAY BRACING WIRES IN LINE WITH MAIN RUNNER

#12 HANGER WIRE AT 4'-0" OC (MAX) 8" (MAX) FROM WALL

NOTE:
SLOPE WIRES AT 45° MIN FROM VERT

(4) TURNS IN 1 1/2" MAX AT EACH END OF WIRE, TYP

2" MAX TYP

2" MAX TYP

4'-0" MAX

1/4" MACHINE BOLT TO MAIN RUNNER

TYPICAL FOR (4) WIRES

MAIN RUNNER HEAVY DUTY

PROVIDE 14 GA CONNECTOR AT ALL INTERSECTIONS

CROSS RUNNER HEAVY DUTY

TRADE SIZES	TUBING THICKNESS INCHES	ALLOWABLE LENGTH EMT CONDUIT L/r=200 MAX	r VALUE
1/2"	0.042	3'-11"	0.235
3/4"	0.049	5'-2"	0.310
1"	0.057	6'-6"	0.391
1 1/4"	0.065	8'-6"	0.511
1 1/2"	0.065	9'-10"	0.593
2"	0.065	12'-6"	0.754

EMT – ELECTRICAL METALLIC TUBING

A WIRE SUSPENSION SYSTEM : NTS

8" MAX OR 1/4 OF LENGTH OF END RUNNER, WHICHEVER IS LESS

12 GA HANGER WIRE

MIN (3) TIGHT TURNS IN 3"

FACE OF FINISH

7/8"x7/8" WALL ANGLE

#6 SMS AT 16" OC TO STRUCTURAL MEMBER

POP RIVET PERIMETER MEMBER AT EACH RUNNER – RIVET COLOR TO MATCH RUNNER

MAIN OR CROSS RUNNER

CEILING PANEL

B FIXED END T-BAR DETAIL : 3"

8" MAX OR 1/4 OF LENGTH OF END RUNNER, WHICHEVER IS LESS

12 GA HANGER WIRE

MIN (3) TIGHT TURNS IN 3"

FACE OF FINISH

7/8"x7/8" WALL ANGLE

3/4" CLR

#6 SMS AT 16" OC TO STRUCTURAL MEMBER

ARMSTRONG BERC2 AT EACH RUNNER AT WALL ANGLE PER ESR-1308 OR APPROVED EQ

MAIN OR CROSS RUNNER

CEILING PANEL

C FREE END T-BAR DETAIL : 3"

GRID CLASSIFICATION	HEAVY DUTY
MFR CATALOG #–MAIN RUNNER	ARMSTRONG, SUPRAFINE XL 7501*
MFR CATALOG #–CROSS RUNNER	ARMSTRONG, XL7520/XL7540*
MFR CATALOG #–RUNNER SPLICE	ARMSTRONG, SUPRAFINE XL 7501*
MFR CATALOG #–RETAINING CLIP	ARMSTRONG, BERC2*

* PROVIDE ARMSTRONG SUPRAFINE XL SYSTEM INSTALLED PER ESR–1308 W/ CBC SUPPLEMENT OR APPROVED EQUAL

DSA IR-25-2.10 NOTES: SEE IR–25.2.10 FOR ADDITIONAL INFO, FIGURES AND REQS.

1. GENERAL REQUIREMENTS: CBC SECTION 1615A1.16 (1615.10.13*) REQUIRES THE DESIGN AND INSTALLATION TO BE IN COMPLIANCE WITH ASTM C635, C636, AND E580, SECTION 5, AS AMENDED BY 2010 CBC SECTION 1615A.1.16 (1615.10.13*).
NOTE: AMENDMENTS IN CBC SECTION 1616A.1.16 (1615.10.13*) REPLACE ASCE 7, SECTION 13.5.6. THE REQUIREMENTS IN THIS IR APPLY TO FLAT AND LEVEL CEILING SYSTEMS WHOSE TOTAL WEIGHT, INCLUDING CEILING MOUNTED AIR TERMINALS, SERVICES AND LIGHT FIXTURES, DOES NOT EXCEED FOUR (4) PSF. HEAVY SYSTEMS, SYSTEMS THAT ARE NOT FLAT AND LEVEL, AND THOSE SUPPORTING LATERAL LOADS FROM PARTITIONS ARE BEYOND THE SCOPE OF THIS IR AND WILL REQUIRE SPECIAL DESIGN DETAILS.

2. SUSPENSION SYSTEM COMPONENTS: SHALL COMPLY WITH ASTM C635 AND SECTION 5.1 OF ASTM E580.
2.1 THE CEILING GRID SYSTEM MUST BE RATED HEAVY DUTY AS DEFINED BY ASTM C635.
2.2 SUSPENSION WIRES SHALL BE #12 GAGE (0.106" DIAMETER), SOFT ANNEALED, AND GALVANIZED STEEL PER ASTM A641, CLASS 1 COATING.
2.3 MAIN RUNNERS, CROSS RUNNERS, SPLICES, EXPANSION DEVICES, AND INTERSECTION CONNECTORS SHALL BE DESIGNED TO CARRY A MEAN ULTIMATE TEST LOAD OF NOT LESS THAN 180 IBS. IN COMPRESION AND TENSION PER ASTM E580 SECTION 5.1.2.

3. SUSPENSION SYSTEM INSTALLATION: SHALL COMPLY WITH ASTM C636 AND SECTION 5.2 OF ASTM E580.
3.1 #12 GAGE HANGER WIRES MAY BE USED FOR UP TO AND INCLUDING 4 FT. BY 4 FT. GRID SPACING AND SHALL BE ATTACHED TO MAIN RUNNERS.
3.2 PROVIDE #12 GAGE HANGER WIRES AT THE ENDS OF ALL MAIN AND CROSS RUNNERS WITHIN EIGHT (8) INCHES OF THE SUPPORT OR WITHIN ONE–FOURTH (1/4) OF THE LENGTH OF THE END TEE, WHICHEVER IS LEAST, FOR THE PERIMETER OF THE CEILING AREA (SEE FIGURE 2). PERIMETER WIRES ARE NOT REQUIRED WHEN THE LENGTH OF THE END TEE IS EIGHT (8) INCHES OR LESS.
3.3 CEILING GRID MEMBERS SHALL BE ATTACHED TO TWO (2) ADJACENT WALLS PER ASTM E580, SECTION 5.2.3. CEILING GRID MEMBERS SHALL BE AT LEAST 3/4 INCH CLEAR OF OTHER WALLS. IF WALLS RUN DIAGONALLY TO CEILING GRID SYSTEM RUNNERS, ONE END OF MAIN AND CROSS RUNNERS SHOULD BE FREE, AND A MINIMUM OF 3/4 INCH CLEAR OF WALL.
3.4 THE WIDTH OF THE PERIMETER SUPPORTING CLOSURE ANGLE SHALL BE NOT LESS THAN 2 INCHES. GRID SYSTEMS WITH SPECIALTY ANGLES AND SUPPORT CLIPS MAY BE ACCEPTABLE IN ACCORDANCE WITH SECTION 11 BELOW.
3.5 AT THE PERIMETER OF THE CEILING AREA, WHERE MAIN OR CROSS RUNNERS ARE NOT CONNECTED TO THE ADJACENT WALL, PROVIDE INTERCONNECTION BETWEEN THE RUNNERS AT THE FREE END TO PREVENT LATERAL SPREADING. A METAL SPREADER STRUT OR A # 16 GAGE WIRE WITH A POSITIVE MECHANICAL CONNECTION TO THE RUNNER MAY BE USED. WHERE THE PERPENDICULAR DISTANCE FROM THE WALL TO THE FIRST PARALLEL RUNNER IS 8 INCHES OR LESS, THIS INTERLOCK IS NOT REQUIRED.

4. EXPANSION JOINTS, SEISMIC SEPARATION JOINTS, AND PENETRATIONS:
4.1 EXPANSION JOINTS SHALL BE PROVIDED IN THE CEILING AT INTERSECTIONS OF CORRIDORS AND AT JUNCTIONS OF CORRIDORS AND LOBBIES OR OTHER SIMILAR AREAS (SEE FIGURE 7, DETAIL A).
4.2 FOR CEILING AREAS EXCEEDING 2,500 SQUARE FEET, A SEISMIC SEPARATION JOINT SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1613A.2.6 TO DIVIDE THE CEILING INTO AREAS NOT EXCEEDING 2500 SQUARE FEET, ALTERNATIVELY, COMPLY WITH ASTM E580, SECTION 5.2.2.
4.3 PENETRATIONS THROUGH THE CEILING FOR SPRINKLER HEADS AND OTHER SIMILAR DEVICES THAT ARE NOT INTEGRALLY TIED TO THE CEILING SYSTEM IN THE LATERAL DIRECTION SHALL HAVE A TWO (2) INCH OVERSIZED RING, SLEEVE OR ADAPTER THROUGH THE CEILING TILE TO ALLOW FREE MOVEMENT OF ONE (1) INCH IN ALL HORIZONTAL DIRECTIONS. ALTERNATIVELY, PER ASTM E580, SECTION 5.2.8.5, A FLEXIBLE SPRINKLER HOSE FITTING THAT CAN ACCOMMODATE 1 INCH OF CEILING MOVEMENT SHALL BE PERMITTED TO BE USED IN LIEU OF THE OVERSIZED RING, SLEEVE, OR ADAPTER.

5. LATERAL FORCE BRACING: LATERAL FORCE BRACING IS REQUIRED PER THIS SECTION FOR ALL CEILING AREAS. THE SPACING OF THE BRACING ASSEMBLIES MUST BE SHOWN ON THE CONSTRUCTION DOCUMENTS.
EXCEPTION: LATERAL FORCE BRACING MAY BE OMITTED FOR SUSPENDED ACOUSTICAL CEILING SYSTEMS WITH A CEILING AREA OF 144 SQUARE FEET OR LESS, AND FIRE RATED SUSPENDED ACOUSTICAL CEILING SYSTEMS WITH A CEILING AREA OF 96 SQUARE FEET OR LESS, WHEN PERIMETER SUPPORT, IN ACCORDANCE WITH SECTION 3.4 OF THIS IR OR WITH ASTM E580 SECTIONS 5.2.2 AND 5.2.3, ARE PROVIDED AND PERIMETER WALLS ARE DESIGNED TO CARRY THE CEILING LATERAL FORCES.
5.1 PROVIDE LATERAL FORCE BRACING ASSEMBLIES CONSISTING OF A COMPRESSION STRUT AND FOUR (4) #12 GAGE SPLAYED BRACING WIRES ORIENTED 90 DEGREES FROM EACH OTHER (SEE FIGURE 1).
5.2 LATERAL FORCE BRACING ASSEMBLIES SHALL BE SPACED AT A MAXIMUM OF 12 FEET BY 12 FEET ON CENTERS FOR SCHOOL BUILDINGS AND 8 FEET BY 12 FEET ON CENTERS FOR ESSENTIAL SERVICES BUILDINGS. THERE SHALL BE A BRACE ASSEMBLY A DISTANCE OF NOT MORE THAN ONE HALF OF THE ABOVE SPACING FROM EACH SURROUNDING WALL, EXPANSION JOINT AND AT THE EDGES OF ANY CEILING VERTICAL OFFSETS.
5.3 THE SLOPE OF BRACING WIRES SHALL NOT EXCEED 45 DEGREES FROM THE PLANE OF THE CEILING AND WIRES SHALL BE TAUT. SPLICES IN WIRES ARE NOT PERMITTED WITHOUT DSA APPROVAL.
5.4 COMPRESSION STRUTS SHALL BE ADEQUATE TO RESIST THE VERTICAL COMPONENT INDUCED BY THE BRACING WIRES, AND SHALL NOT BE MORE THAN 1 (HORIZONTAL) IN 6 (VERTICAL) OUT OF PLUMB.

6. ATTACHMENT OF HANGER AND BRACING WIRES:
6.1 FASTEN #12 HANGER WIRES WITH NOT LESS THAN THREE (3) TIGHT TURNS IN 3 INCHES. HANGER WIRE LOOPS SHALL BE TIGHTLY WRAPPED AND SHARPLY BENT TO PREVENT ANY VERTICAL MOVEMENT OR ROTATION OF THE MEMBER WITHIN THE LOOPS (SEE ASTM E550, SECTION 5.2.7.2).
6.2 FASTEN #10 OR #12 BRACING WIRES WITH FOUR (4) TIGHT TURNS. MAKE ALL TIGHT TURNS WITHIN A DISTANCE OF 1–1/2 INCHES.
6.3 HANGER OR BRACING WIRE ANCHORED TO THE STRUCTURE SHOULD BE INSTALLED IN SUCH A MANNER THAT THE DIRECTION OF THE ANCHOR ALIGNS AS CLOSELY AS POSSIBLE WITH THE DIRECTION OF THE WIRE.
6.4 SEPARATE ALL CEILING HANGER AND BRACING WIRES AT LEAST SIX (6) INCHES FROM ALL UNBRACED DUCTS, PIPES, CONDUIT, ETC.
6.5 HANGER WIRE SHALL NOT ATTACH TO OR BEND AROUND INTERFERING MATERIAL OR EQUIPMENT. PROVIDE BRACES OR OTHER SUPPLEMENTARY SUPPORT MEMBERS AT OBSTRUCTIONS TO TYPICAL HANGER SPACING (SEE FIGURE 3A, DETAIL F). PROVIDE ADDITIONAL HANGERS, STRUTS OR BRACES AS REQUIRED AT ALL CEILING BREAKS, SOFFITS, OR DISCONTINUOUS AREAS.
6.6 HANGER WIRES THAT ARE MORE THAN 1 (HORIZONTAL) IN 6 (VERTICAL) OUT OF PLUMB SHALL HAVE COUNTER–SLOPING WIRES. PERIMETER HANGER WIRES AT MAIN RUNNERS THAT ARE POSITIVELY ATTACHED TO THE PERIMETER CLOSURE ANGLE COUNTER–SLOPING IS OPTIONAL.
6.7 WHERE ASSEMBLY HANGER WIRES ARE NOT COUNTER–SLOPING AS ATTACHED FIGURES, ATTACHMENT OF BRACING WIRES TO THE STRUCTURE ABOVE AND TO THE MAIN RUNNERS SHALL BE ADEQUATE FOR THE LOAD IMPOSED. THE WEIGHT (WP) SHALL BE TAKEN AS NOT LESS THAN 4 PSF FOR CALCULATING SEISMIC FORCES (FP).
6.8 WHEN DRILLED–IN CONCRETE ANCHORS OR SHOT–IN ANCHORS ARE USED IN REINFORCED CONCRETE FOR HANGER WIRES, LOUT OF 10 WIRE/ANCHOR ASSEMBLIES MUST BE FIELD TESTED FOR 200 IBS. IN TENSION. WHEN DRILLED–IN CONCRETE ANCHORS ARE USED FOR BRACING WIRES, LOUT OF 2 WIRE/ANCHOR ASSEMBLIES MUST BE FIELD TESTED FOR 440 IBS. IN TENSION IN THE DIRECTION OF THE WIRE. SHOT–IN ANCHORS IN CONCRETE ARE NOT PERMITTED FOR BRACING WIRES.
NOTE: DRILLED–IN OR SHOT–IN ANCHORS REQUIRE DSA APPROVAL PRIOR TO USE IN PRESTRESSED CONCRETE.

7. CEILING FIXTURES, TERMINALS, AND DEVICES: ALL FIXTURES, TERMINALS, AND OTHER DEVICES SHALL BE MOUNTED IN A MANNER THAT WILL NOT COMPROMISE CEILING PERFORMANCE IN ACCORDANCE WITH SECTION 13.5.6.2.2(5) OF ASCE 7–05 AS AMENDED BY 2010 CBC SECTION 1615A.1.16 (1615.10.13*) AND ASTM E550 SECTIONS 5.3.1 TO 5.4.
7.1 CEILING PANELS SHALL NOT SUPPORT ANY LIGHT FIXTURES, AIR TERMINALS OR DEVICES.
7.2 IN ADDITION TO ALL LIGHT FIXTURES, CEILING MOUNTED AIR TERMINALS, AND ALL OTHER DEVICES TO THE CEILING GRID RUNNERS TO RESIST A HORIZONTAL FORCE EQUAL TO THE WEIGHT OF THE FIXTURES, SCREWS OR APPROVED FASTENERS ARE REQUIRED. A MINIMUM OF TWO ATTACHMENTS ARE REQUIRED AT EACH LIGHT FIXTURE, PER ASTM E550, SECTION 5.3.1.
7.3 SURFACE MOUNTED OR DROP–IN LIGHT FIXTURES, GRILLES, MECHANICAL TERMINALS, AND FLEXIBLE SPRINKLER HOSE FITTINGS OR OTHER SERVICES BE SUPPORTED DIRECTLY ON RUNNERS CLASSIFIED AS ASTM HEAVY DUTY, BUT THEY MUST ALSO HAVE A MINIMUM OF TWO (2) #12 GAGE SLACK SAFETY WIRES ATTACHED TO THE FIXTURE AT DIAGONAL CORNERS AND ANCHORED TO THE STRUCTURE ABOVE.
7.4 ALL FLUSH OR RECESSED LIGHT FIXTURES, MECHANICAL TERMINALS, A NO FLEXIBLE SPRINKLER HOSE FITTINGS OR OTHER SERVICES WEIGHING 56 IBS. OR MORE MUST BE INDEPENDENTLY SUPPORTED BY NOT LESS THAN FOUR (4) TAUT #12 GAGE WIRES ATTACHED TO THE HOUSING AND TO THE STRUCTURE ABOVE. THE FOUR (4) TAUT #12 GAGE WIRES, INCLUDING THEIR ATTACHMENT TO THE STRUCTURE ABOVE, MUST BE CAPABLE OF SUPPORTING FOUR (4) TIMES THE WEIGHT OF THE UNIT.
7.5 ALL 4 FT. X 4 FT., LIGHT FIXTURES MUST HAVE SLACK SAFETY WIRES AT EACH CORNER.
7.6 SURFACE–MOUNTED FIXTURES SHALL BE ATTACHED TO THE MAIN RUNNER WITH AT LEAST TWO POSITIVE CLAMPING DEVICES MADE OF MATERIAL WITH A MINIMUM #14 GAGE. ROTATIONAL SPRING CATCHES DO NOT COMPLY. A #12 GAGE SUSPENSION WIRE SHALL BE ATTACHED TO EACH CLAMPING DEVICE TO THE STRUCTURE ABOVE. PROVIDE ADDITIONAL SUPPORTS WHEN LIGHT FIXTURES ARE 8 FT. OR LONGER. MAXIMUM SPACING BETWEEN SUPPORTS SHALL NOT EXCEED 8 FEET.
7.7 SUPPORT PENDANT–MOUNTED LIGHT FIXTURES DIRECTLY FROM THE STRUCTURE ABOVE WITH HANGER WIRES OR CABLES PASSING THROUGH EACH PENDANT HANGER AND CAPABLE OF SUPPORTING TWO (2) TIMES THE WEIGHT OF THE FIXTURE. SEE IR 16–9FOR ADDITIONAL REQUIREMENTS FOR PENDENT MOUNTED FIXTURES
IF THE PENDANT MOUNTED LIGHT FIXTURE IS DIRECTLY AND INDEPENDENTLY BRACED BELOW THE CEILING, I.E. AIRCRAFT CABLES TO WALLS, THEN A BRACE ASSEMBLY IS NOT REQUIRED ABOVE THE CEILING.
IF THE PENDANT MOUNTED LIGHT FIXTURE IS NOT DIRECTLY AND INDEPENDENTLY BRACED BELOW THE CEILING, THEN A BRACING ASSEMBLY, PER FIGURE 1, IS REQUIRED WHERE THE PENDANT HANGER PENETRATES THE CEILING. SPECIAL DETAILS ARE REQUIRED TO ATTACH THE PENDANT HANGER TO THE BRACING ASSEMBLY TO TRANSMIT HORIZONTAL FORCE. EXCEPTION: WHERE THE WEIGHT OF THE FIXTURE IS LESS THAN 20 POUNDS, THE COMPRESSION POST SHOWN IN FIGURE 1 IS NOT REQUIRED.
7.8 ALL LIGHTWEIGHT MISCELLANEOUS DEVICES, SUCH AS STROBE LIGHTS, SPEAKERS, ETC., SHALL BE ATTACHED TO THE CEILING GRID PER SECTION 7.1 OF THIS IR. IN ADDITION, DEVICES WEIGHING MORE THAN 10 IBS SHALL HAVE A #12 SLACK SAFETY WIRE ANCHORED TO THE STRUCTURE ABOVE. DEVICES WEIGHING MORE THAN 20 IBS SHALL BE S

VERIFY

FOF

FREE END

6'-0" TYP

SPLAY

EQ2 PANEL

SPLAY

6'-0" MAX TYP

FOF

SPLAY

SPLAY

12'-0" MAX

FREE END

FIXED END

VERIFY

EQ1 PNL

EQ1 PNL

SPLAY

SPLAY

6'-0" TYP

SPLAY

EQ2 PANEL

SPLAY

6'-0" MAX TYP

FOF

FOF

FIXED END

FACE OF WALL FINISH, TYP

SUSPENDED ACOUSTICAL TILE CEILING – SEE REFLECTED CEILING PLAN(S) FOR CEILING TYPE

REFER TO CEILING PLAN FOR SPECIAL LAYOUT COMMENTS THAT INDICATE SPECIAL START LAYOUT POINTS

TYPICAL SUSPENDED CEILING LAYOUT :1/4"

TYPICAL 12 GA GALV VERTICAL HANGER WIRE AT 4' OC EACH WAY WITH MINIMUM (3) TIGHT TURNS IN 1 1/2" BOTH ENDS OF WIRE INSTALL HANGER WIRES MAXIMUM 8" FROM EACH PERIMETER WALL

TYPICAL 12 GA GALV SPLAY WIRE AT 12" OC EACH WAY; 96 SF MAX OF FIRE RATED CEILING WITH MIN (4) TIGHT TURNS IN 1 1/2" BOTH ENDS OF WIRE, TYP OF (4) PER LOCATION INSTALL COMPRESSION STRUT AND SPLAY WIRES AT MAX 6' FROM EACH PERIMETER WALL 4' AT FIRE RATED CEILINGS

45° TYP

MR

MR

MR

MR

TYP CROSS RUNNER

TYP MAIN RUNNER

NOTES:
1. SEE DETAILS FOR CONNECTIONS OF SPLAY AND HANGER WIRES TO THE STRUCTURE ABOVE– SEE SHEET S1.14.
2. ELEC FIXTURES AND MECH EQUIP TO BE SUPPORTED BY SEPARATE 12 GA WIRES AT EACH CORNER MIN–SEE STRUCT DETAILS FOR CONNECTIONS TO STRUCTURE ABOVE.
3. REFER TO IR 25–2.10 FOR ADDITIONAL REQUIREMENTS.
4. REFER TO PROJECT MANUAL FOR ADDITIONAL REQS.

D SUSPENDED CEILING GRID : NTS

09-02-02M

A8.50
A5.00

31 WIRE SUSPENSION SYSTEM - METAL SYSTEMS : AS NOTED

14 NOT USED

15 NOT USED

24 NOT USED

25 NOT USED

FRAMING/SHEATHING PER PLANS

4" NOM VER W/ MFR

4"x 26 GA GI CONT SOFFIT VENT

DIRECT APPLIED FINISH SYSTEM

SOFFIT VENT

SUBSTRATE

FRAMING/SHEATHING PER PLANS–TYP

STONE VENEER SYSTEM — 4/A8.41

ES4 SEALANT W/ BACKER ROD

TERMINATION TRIM PER SYSTEM MFR

SEE PLANS BOT SOFFIT

DIRECT APPLIED FINISH SYSTEM

1/2"

SOFFIT TO FASCIA TRANSITION

FRAMING/SHEATHING PER PLANS

TERMINATION TRIM BY SYSTEM MFR

ES9 SEALANT W/ BACKER ROD

VERTICAL WALL PER PLANS

ASTM C1177 SHEATHING PER SYSTEM MFR'S INSTRUCTION

REINFORCING MESH NOM 4.5 OZ/SQ.YD SYMMETRICAL INTERLACED OPEN–WEAVE GLASS FIBER FABRIC W/ ALKALINE RESISTANT COATING

ONE COMPONENT POLYMER MODIFIED CEMENT BASED BASE COAT W/ LESS THAN 33% PORTLAND CEMENT BY WT

ACRYLIC BASED TEXTURED FINISH OVER ACRYLIC BASED PRIMER

NOTE:
1. DIRECT APPLIED FINISH SYSTEM BY EIFS SYSTEM MFR TO MATCH FINISH–STO QUIK GOLD SYSTEM OR APPROVED EQUAL
2. PROVIDE EXPANSION JOINT PER SYSTEM MFR'S INSTRUCTION AT 30 FT OC MAX

A8.41
A5.00

36 DIRECT APPLIED FINISH SYSTEM : 6"

WALK–IN–BOX

CONT 3"x 18GA BACKING AT T–BAR ANGLE

+9'–0" FIN CLG

CEILING PANEL FREE END AT WALK–IN–BOX

31C / A8.50 SIM

MFR WALL ANGLE #6 SMS TO WALK–IN–BOX AT 16" OC

A5.02

41 NOT USED

42 NOT USED

43 T-BAR CLG AT WALK-IN-BOX : 3"

3/4" CLR

SCREW ATTACHMENT AT EACH RUNNER AT FIXED ENDS–OMIT SCREWS AT FREE ENDS

COMPRESSION STRUT W/ OCCURS

31 / A8.50

HANGER WIRE TO STRUCTURE — 1 / S1.14

LINEAR CARRIER

POP RIVET PERIMETER MEMBER AT EACH RUNNER AT FIXED ENDS–OMIT RIVETS AT FREE ENDS–RIVET COLOR TO MATCH TRIM

CUSTOM 2" TRIM CHANNEL CURVED TO MATCH CLG RADIUS

6" TYP

2"

7.1/4"x .3/4" METAL PAN– TYP

A

CURVED FLATCHANNEL PER MFR TO ACCEPT METAL PAN

NOTES:
1. SEE DETAIL FOR TYP SUSPENDED CEILING SYSTEM REQS. — 31 / A8.50
2. TOTAL WEIGHT OF THE SYSTEM INCLUDING CEILING MOUNTED FIXTURE SHALL NOT EXCEED (4) PSF.
3. PER ESR–1222, SECTION 5.4, QUALITY ASSURANCE PLAN COMPLYING WITH IBC CHAPTER 17 INCLUDING 2012 IBC SECTION 1704.3 (2009 AND 2006 IBC SECTIONS 1705.2 AND 1705.3) MUST BE SUBMITTED TO CODE OFFICIAL PRIOR TO INSTALLATION OF THIS SYSTEM.
[illegible] PER ESR–1222, SECTION 5.5 (2012 IBC SECTION 1705.2, ITEM 5, 2009 IBC SECTION 1705.3, ITEM 4.5 FOR THE 2006 IBC, AS APPLICABLE

B CROSS SECTION VIEW

A5.01
A5.00

44 WOOD VENEER LINEAR SUSPENDED CEILING SYSTEM : 6"

46 NOT USED

JOISTS/STUDS – SEE REFLECTED CEILING PLANS AND WALL TYPES FOR SIZES

#8 TEK AT 12" OC ALL AROUND

VERIFY WITH MFR

WIDTH

1" MIN TYP

FINISH – SEE WALL SCHEDULES AND REFLECTED CEILING PLANS

14 GA FRAME AND DOOR PANEL

A SECTION :3"

DOUBLE CJ EACH SIDE

A

DOUBLE CJ HEADER, TYP

ONE PIECE FRAME

CYLINDER LOCK WHERE NOTED

ATTIC ACCESS – FIELD VERIFY HEIGHT AND DIMENSIONS

PLAN :1/2"

08-10-01

A5.00
A2.10

51 ACCESS DOOR AT GYPSUM BOARD : AS NOTED

52 NOT USED

53 NOT USED

STRUCTURAL BEAM SEE PLAN

12"OC

16GA G90 GALV "PRESTIGE PS12 PANELCLIP" AT 48"OC

#12X1 1/2" SELF DRILLER AT 48"OC

12" PANEL WIDTH

18GA PREFINISHED METAL SOFFIT PANEL

PREFINISHED METAL PANEL:
AEP SPAN:
"PRESTIGE SERIES PS12"
IAPMO ER–0309

1 1/2"

12"

18GA PREFINISHED METAL SOFFIT PANEL

#12x1–1/2" SELF DRILLER @ 48" OC

A500

54 PRE-FINISHED METAL SOFFIT PANEL : 3"

GRID CLASSIFICATION	HEAVY DUTY
MFR CATALOG #–MAIN RUNNER	USG, DGLW7245
MFR CATALOG #–CROSS RUNNER	USG, DGLW [illegible] *
MFR CATALOG #–RUNNER SPLICE	USG, DGLW7245 *
MFR CATALOG #–RETAINING CLIP	USG ACM7 SEISMIC CLIP*

* PROVIDE USG [illegible] SYSTEM INSTALLED PER ESR–1222 W/ CBC SUPPLEMENT OR APPROVED EQUAL MI PARALINE METAL PAN/FLATCHANNEL

1/4"x20 THREADED ROD FULL HT SEE STRUCT SHTS — 3 / S1.14

6"x6"x1/4" PLATE W/ (4) 1/2" HOLES–PAINT

(4) 12 GA SPLAY WIRES EACH CONNECTION — 1 / S1.14

6" MAX

CLG ESCUTCHEON WH/ OCCURS

SUSPENDED CEILING PANELS CENTER SUPPORT EA PANEL WH/ OCCURS

NOTE:
FOR FIXTURE HARDWARE / CONNECTION / POWER SEE E–SHEETS FOR ADDITIONAL REQS

A5.00

56 SUSPENDED LIGHT SUPPORT - TYP : 6"

ap architects
3434 Truxtun Avenue . Suite 240
Bakersfield . California . 93301
tel|661.327.1890 fax|661.327.7201
web|www.aparchitects.net

STUDENT CENTER

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West Kern Community College District

DSA SET

ARCHITECT

LICENSED ARCHITECT KEVIN COBB C-26729 REN 10-31-15 STATE OF CALIFORNIA

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CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACCESS FLS SS
DATE SEP 16 2015

PROJECT INFO

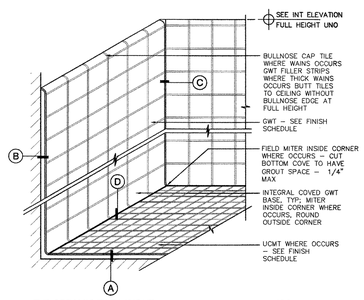
Project No	430–0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

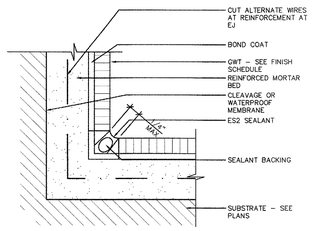
No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

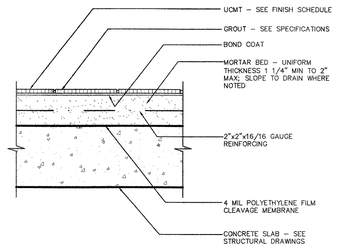
A8.50



TYP CERAMIC TILE LAYOUT : ISO

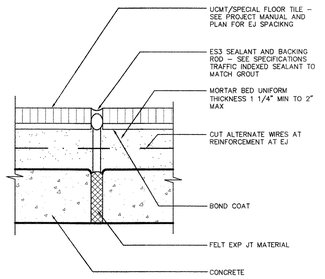


C EJ - GWT VERTICAL CONDITION : NTS

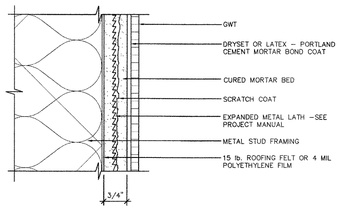


A UCMT AT INT FLOOR : 3"

TCNA F111

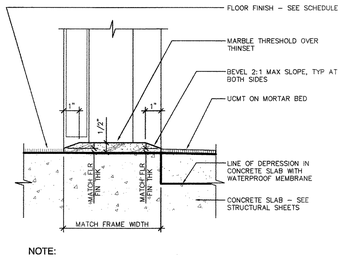


D EJ - CONC FLOOR : NTS



B GWT AT METAL STUD : 6"

TCNA W241



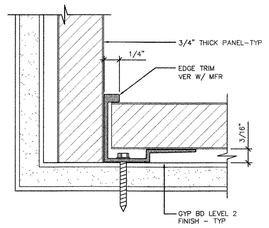
NOTE:
VERIFY FRAME PROFILE PRIOR TO FABRICATION OF THRESHOLD

E MARBLE THRESHOLD : 3"

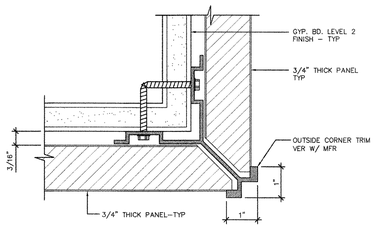
09-07-01

A8.22
A2.20
A2.00

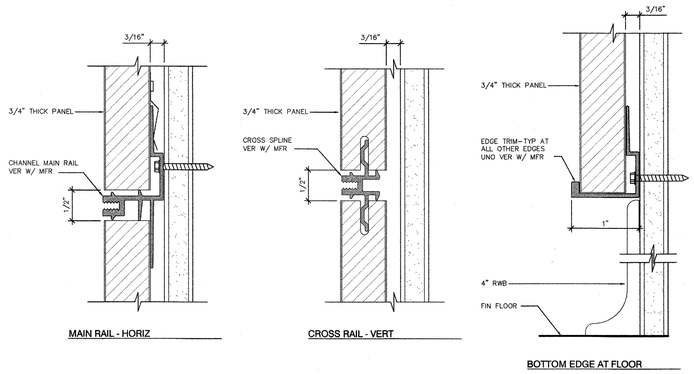
31 TYPICAL CERAMIC TILE DETAILS : AS NOTED



INSIDE CORNER

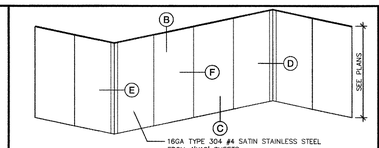


OUTSIDE CORNER

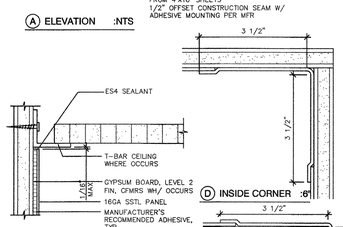


A2.00

51 VENEER WOOD PANEL SYSTEM :FULL

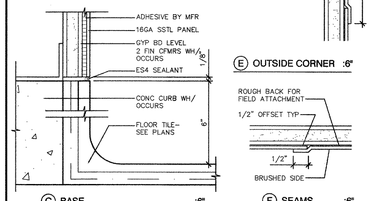


A ELEVATION :NTS



B CEILING :6"

D INSIDE CORNER :6"



C BASE :6"

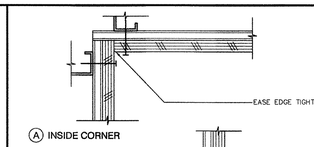
E OUTSIDE CORNER :6"

F SEAMS :6"

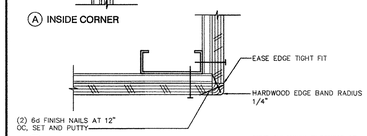
09-04-02

A2.00

23 TYPICAL STAINLESS STEEL WALL FINISH : AS NOTED

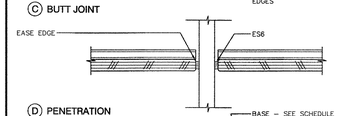


A INSIDE CORNER



B OUTSIDE CORNER

C BUTT JOINT



D PENETRATION

E CEILING

F FLOOR

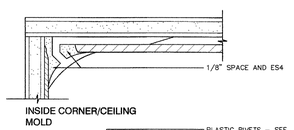
FINISH NOTES:

1. SET SCREWS FLUSH WITH SURFACE
2. PAINT PLYWOOD AFTER INSTALLATION
3. PATCH PLYWOOD IMPERFECTIONS, SAND TO MATCH ADJACENT PLYWOOD
4. 2" x #8 SCREWS AT 8" OC FIELD AND PERIMETER; ALIGN ALL SCREW HEADS ± 1/4" DEVIATION
5. SET AND PUTTY NAILS

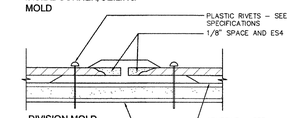
09-09-02

A8.20
A2.00

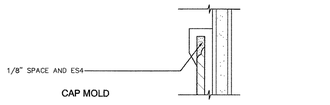
24 TYPICAL PLYWOOD JOINT DETAILS : 1 1/2"



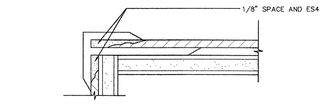
INSIDE CORNER/CEILING MOLD



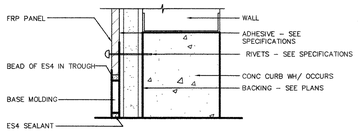
DIVISION MOLD



CAP MOLD



OUTSIDE CORNER MOLD



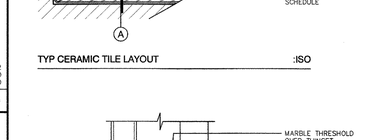
BASE MOLD

09-09-01

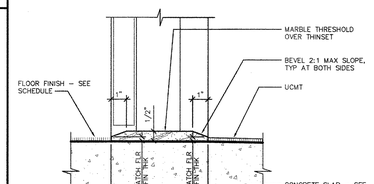
A2.00
A2.02

25 TYPICAL FRP DETAILS : NTS

26 NOT USED

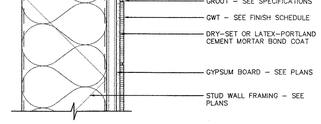


TYP CERAMIC TILE LAYOUT :ISO



NOTE:
VER FRAME PROFILE PRIOR TO FABRICATION OF THRESHOLD

MARBLE THRESHOLD : 3"

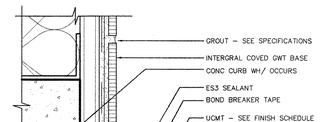


A UCMT AT INT FLOOR : 3"

TCA F122-03

B GWT AT STUD WALL : 3"

TCA W243-03



C PERIMETER JOINT : 6"

TCA EJT71-03

09-07-02

A2.00

43 TYPICAL CERAMIC TILE - THINSET : AS NOTED

35 NOT USED

36 NOT USED

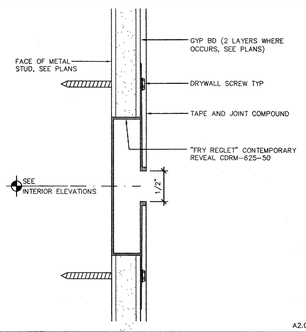
45 NOT USED

46 NOT USED

53 NOT USED

54 NOT USED

55 NOT USED



A2.00

56 REGLET REVEAL AT GYP BD :FULL

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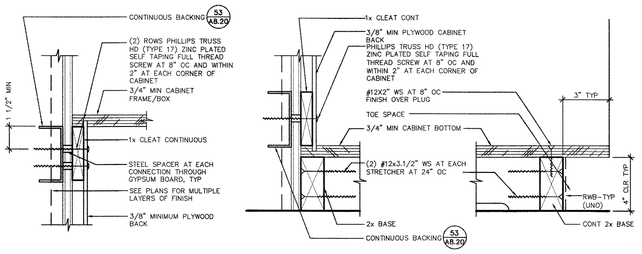
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.51

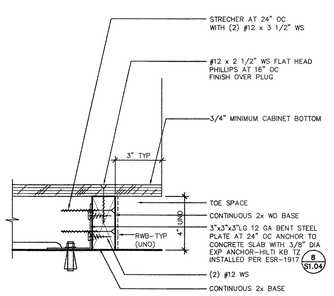


A WALL CONNECTION :3"

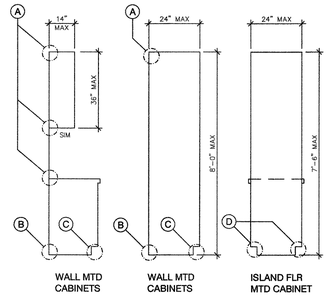
B WALL CONNECTION :3"

C TOE SPACE :3"

NOTE: MIN (4) FASTENERS PER CAB MODULE AT TOP AND BOT CLEATS



D BASE CONNECTION :3"



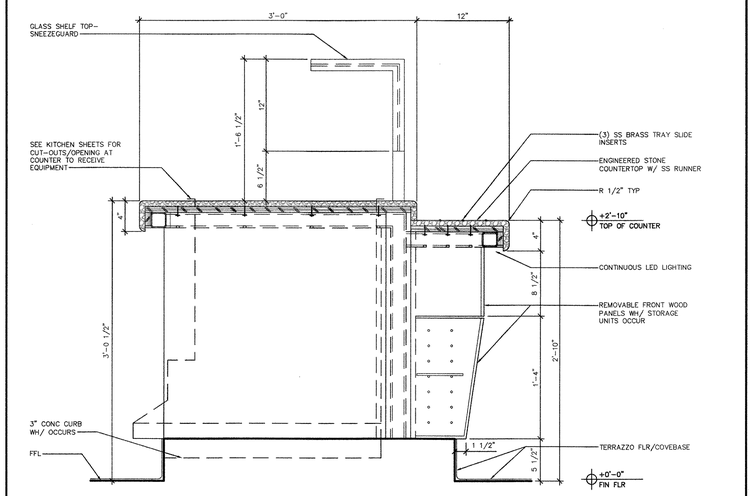
CABINET PROFILES NTS

4"x20GA STUD AT 16" OC = MAX 13'-0" HT = MIN WALL FRAMING AT WALL MTD CABS.
6"x20GA STUD AT 16" OC = MAX 20'-0" HT

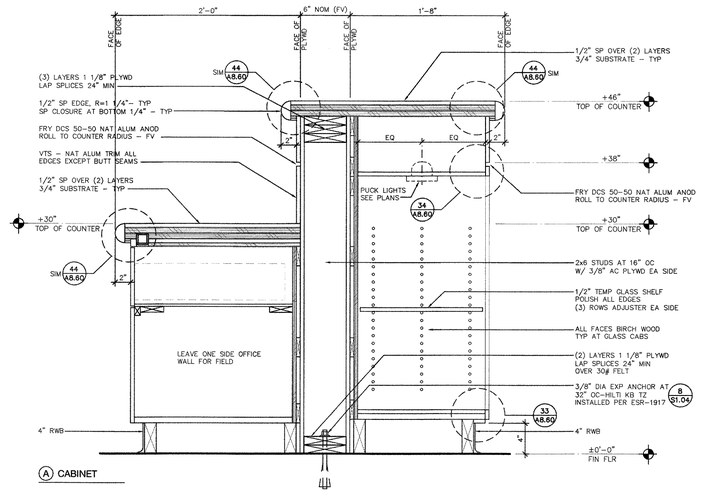
06-05-01M

A8.00
A7.00
A6.00

21 TYPICAL CABINET MOUNTING DETAIL - METAL FRAMING : AS NOTED



23 TYP SERVING COUNTER SECTION : 1 1/2"



A CABINET

06-05-16M A8.20

31 COUNTER / BRACE : 1 1/2"

32 NOT USED

A8.60

33 COUNTER REVEAL : 6"

A8.60

34 COUNTER REVEAL : 6"

B CABINET

NOTE:
THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER LAVATORIES. GRIND/SAND SMOOTH BEFORE FINISHING FLAME SPREAD 0-25

06-05-11

51 COUNTER AT LAVATORY : 1 1/2"

52 NOT USED

43 NOT USED

A8.60

44 COUNTER EDGE : 6"

A7.00

53 COUNTER : 1 1/2"

A7.00

C CABINET

55 BOOKSTORE COUNTER : 1 1/2"

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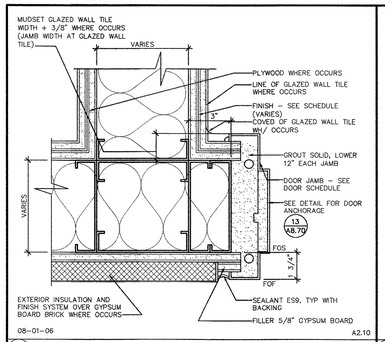
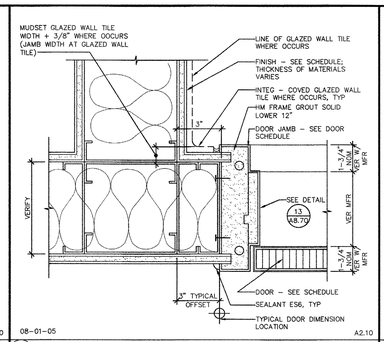
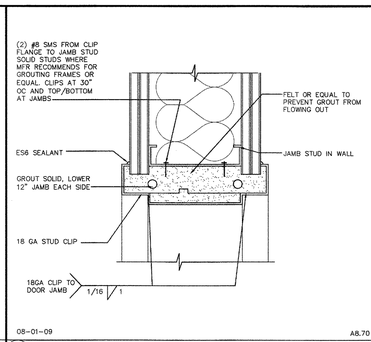
A8.60



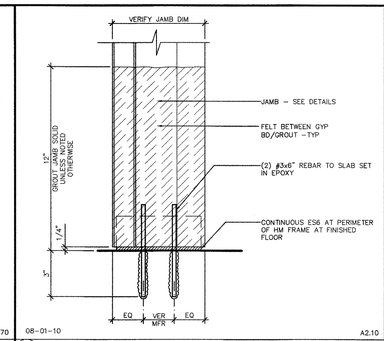
11 TYPICAL HM EXTERIOR JAMB OFFSET : 3"



12 TYPICAL HM INTERIOR DOOR JAMB OFFSET : 3"

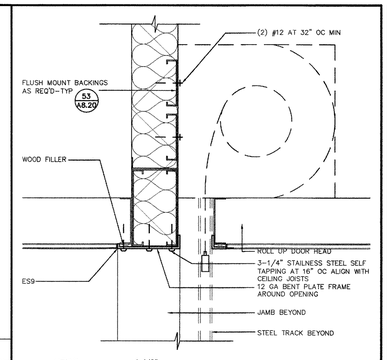


13 TYPICAL HM FRAME CLIP AT METAL STUD : 3"

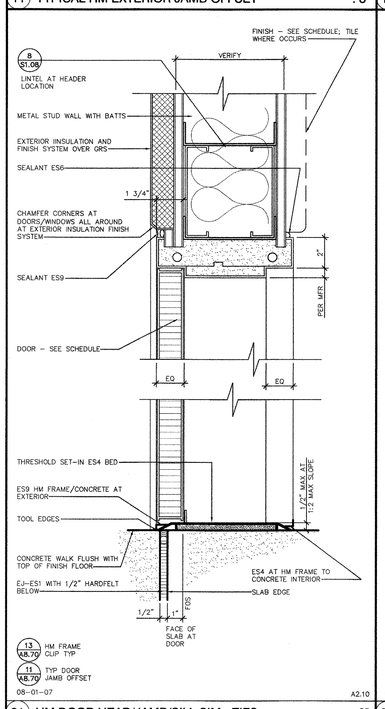


14 TYPICAL DOOR JAMB GROUT : 3"

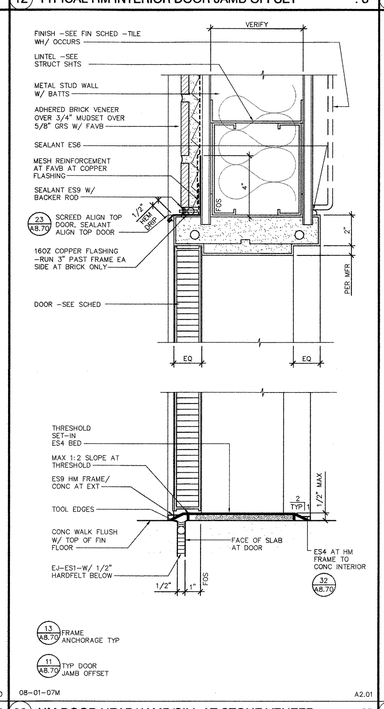
15 NOT USED



26 ROLL-UP DOOR AT INTERIOR : AS NOTED

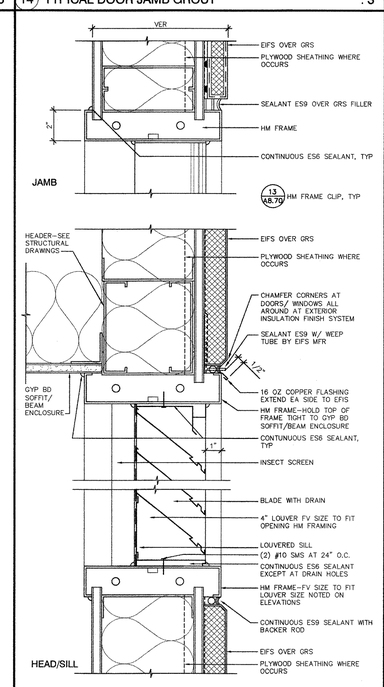


31 HM DOOR HEAD/JAMB/SILL SIM - EIFS : 3"



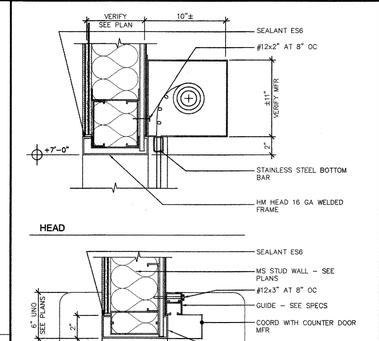
32 HM DOOR HEAD/JAMB/SILL AT STONE VENEER : 3"

33 NOT USED



34 LOUVER AT HM FRAME : 3"

35 NOT USED

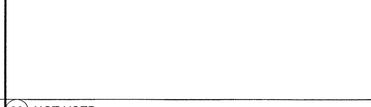


46 ROLL-UP COUNTER DOOR : 1 1/2"

51 HOLLOW METAL DOOR FRAME HEAD/SILL - INTERIOR : 3"

52 HM WINDOW HEAD/SILL - JAMB SIM : 3"

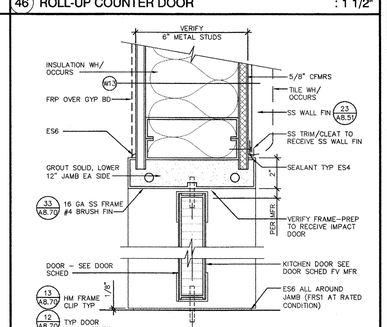
53 NOT USED



43 SS DOOR FRAME : 3"

44 NOT USED

45 NOT USED



56 DOUBLE-ACTING DOOR FRAME HEAD/SILL (JAMB SIM) : 3"

54 NOT USED

55

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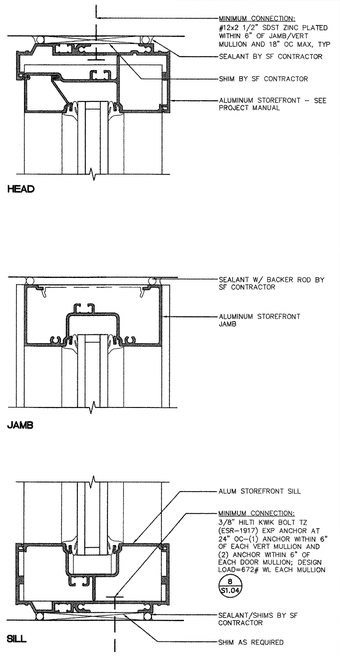
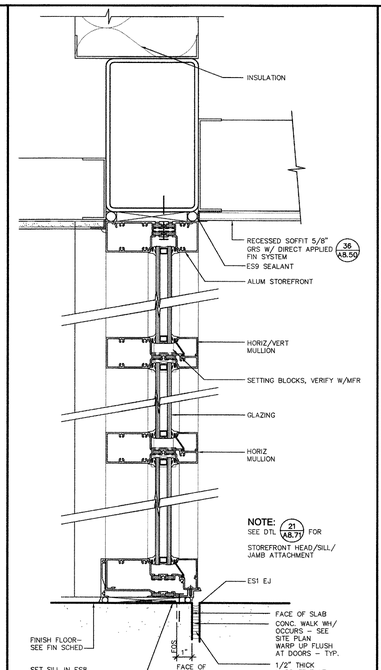
A8.70



08-08-16M

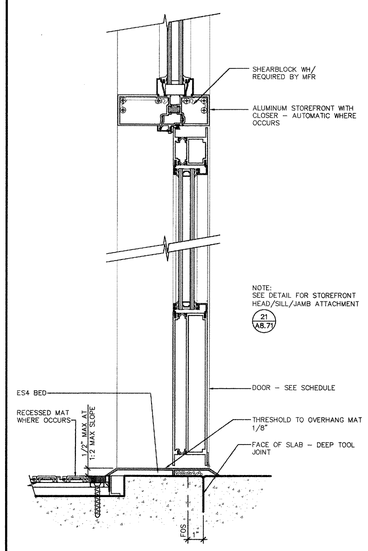
A8.71
A2.10

21 TYPICAL SF CONNECTION AT METAL FRAMING : 6"



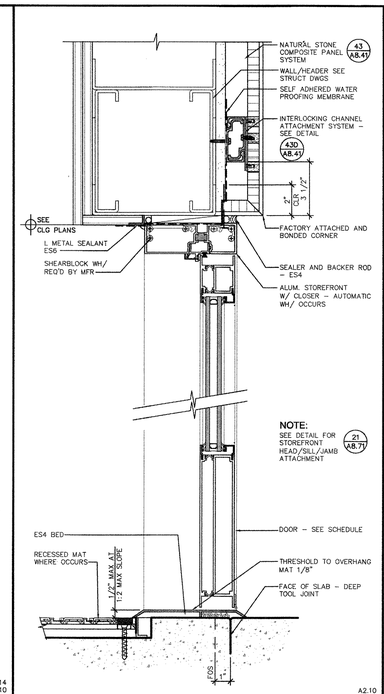
A8.22
A2.14

22 SF WINDOW HEAD/MULLION/SILL AT EXTERIOR : 3"



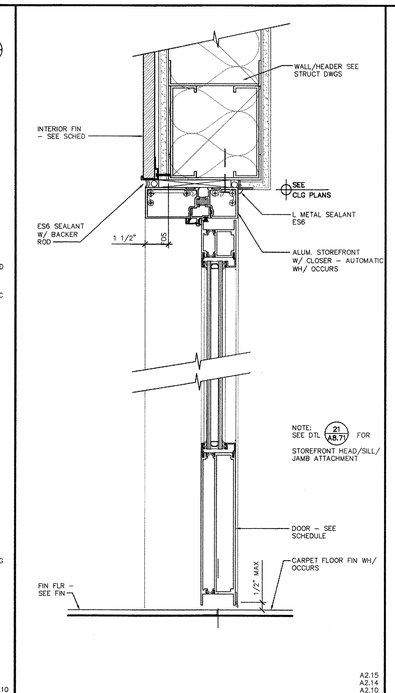
A2.14
A2.10

23 SF DOOR AT EXTERIOR : 3"



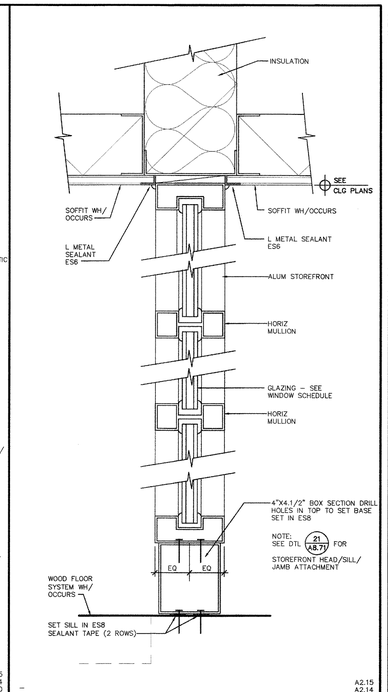
A2.10

24 SF DOOR AT EXTERIOR : 3"



A2.15
A2.14
A2.10

25 SF DOOR AT INTERIOR : 3"



A2.15
A2.14

26 INTERIOR SF HEAD/MULLION/SILL : 3"

A2.14

41 SF HEAD/MULLION/SILL/JAMB SIM - NON FULL HT : 3"

A2.14

42 SF WINDOW HEAD/MULLION/SILL AT EXT - EIFS : 3"

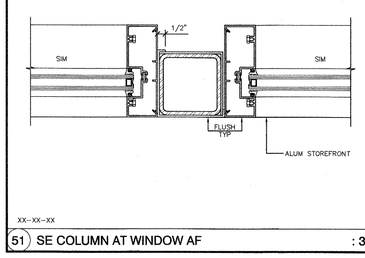
43 NOT USED

44 NOT USED

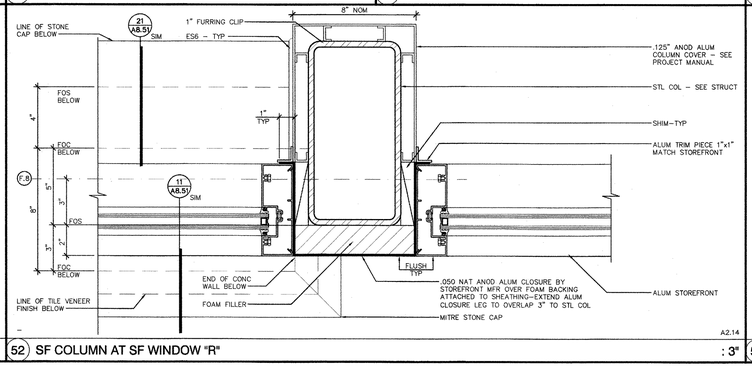
A2.10

45 SF DOOR SYSTEM AT INTERIOR : 3"

46 NOT USED



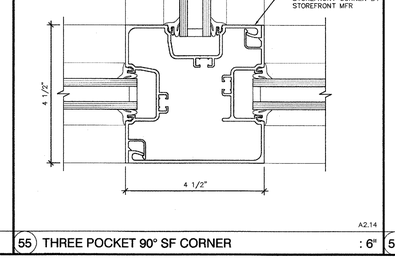
51 SE COLUMN AT WINDOW AF : 3"



A2.14

52 SF COLUMN AT SF WINDOW "R" : 3"

54 NOT USED



A2.14

55 THREE POCKET 90° SF CORNER : 6"

56 NOT USED

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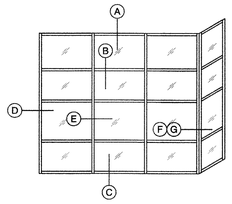
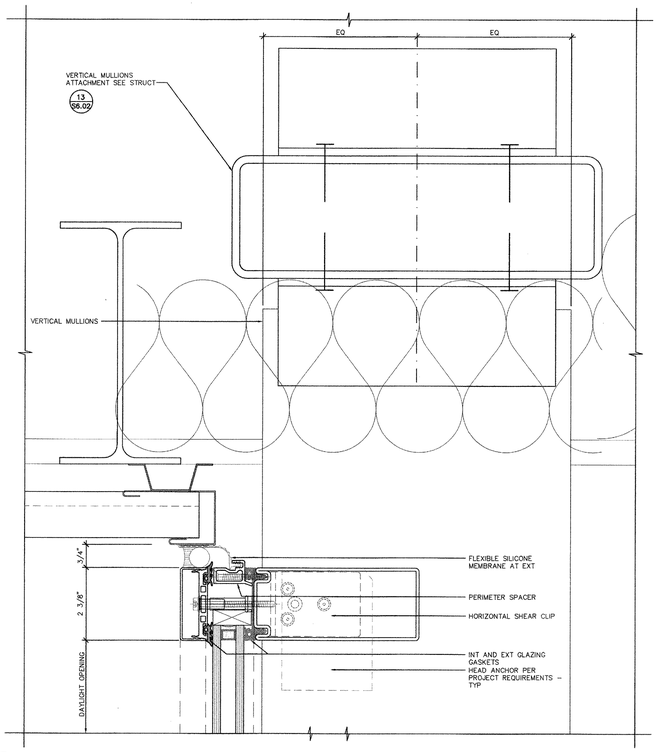
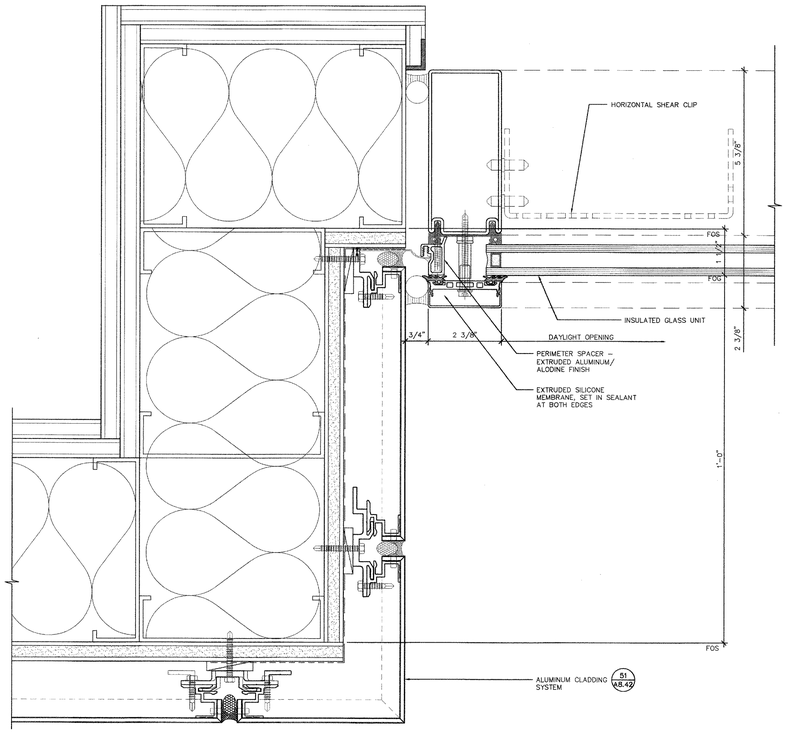
A8.71



(*) KEY ISOMETRIC : NTS

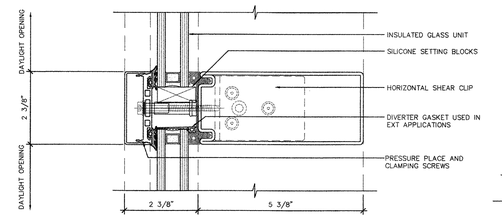


(A) HEAD SECTION : 6"



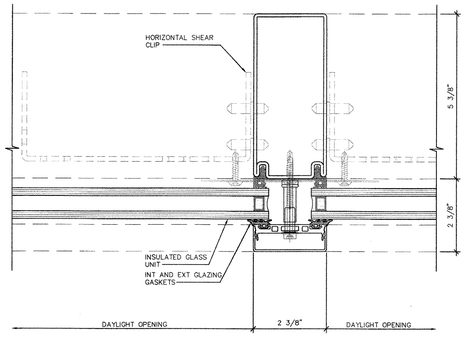
(D) JAMB SECTION : 6"

A2.21

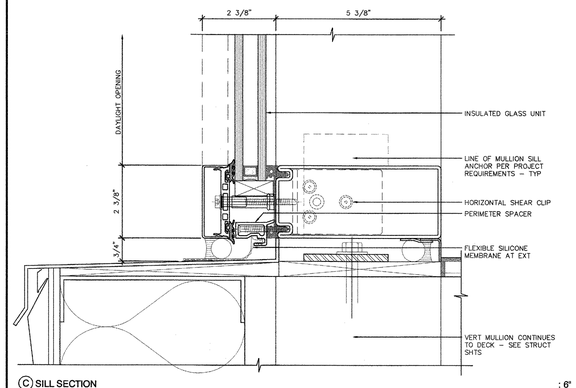


(B) HORIZONTAL MULLION SECTION : 6"

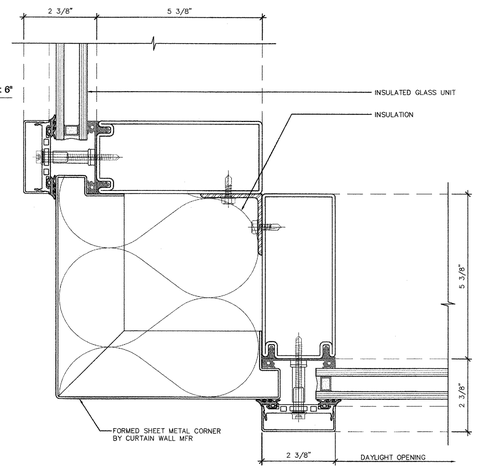
NOTE:
1. CURTAIN WALL SYSTEM IS A DEFERRED APPROVAL ITEM.
2. DETAILS ARE SHOWN FOR BASES OF DESIGN.
3. SEE PROJECT MANUAL.



(E) VERTICAL MULLION SECTION : 6"



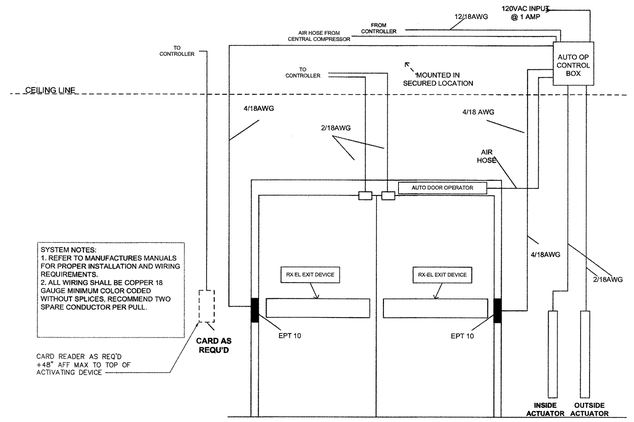
(C) SILL SECTION : 6"



(F) 90° OUTSIDE CORNER : 6"

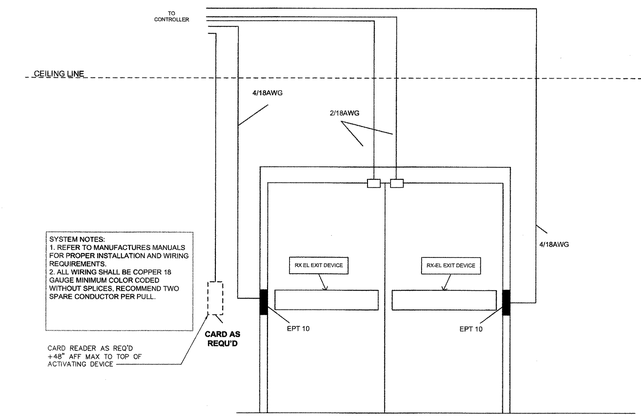
A2.10

51 CURTAIN WALL WINDOW AT CLERESTORY : AS NOTED



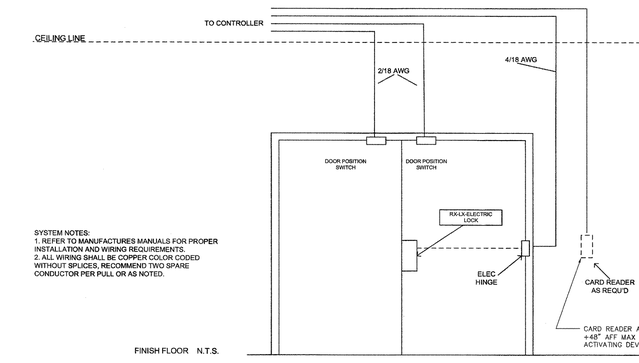
25 ACCESS CONTROL - TYPICAL AT DOORS 500, 500B, 501 : NTS

A2.10



45 ACCESS CONTROL - TYPICAL AT DOORS 500A, 501A, 501B, 501C, 510 : NTS

A2.10



55 ACCESS CONTROL - TYPICAL AT DOORS 502, 510B : NTS

A2.10

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DSA SET

ARCHITECT

LICENSED ARCHITECT KEVIN COBB C-26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
ACCEPTED FLS BS
DATE SEP 16 2015

PROJECT INFO

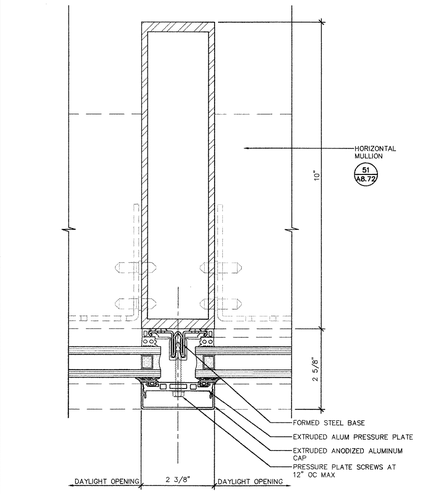
Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

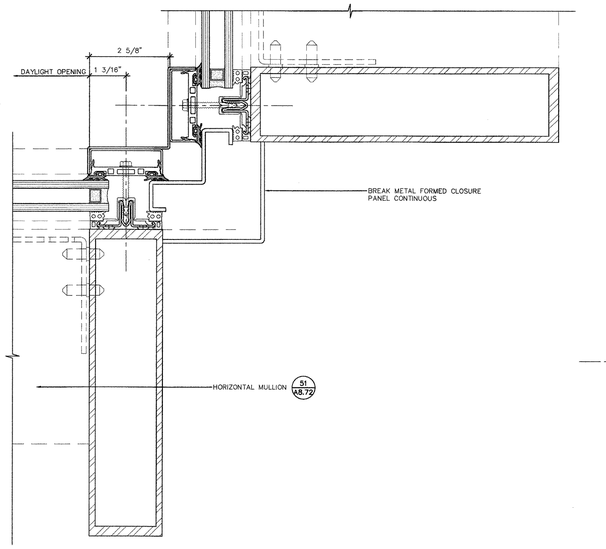
No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

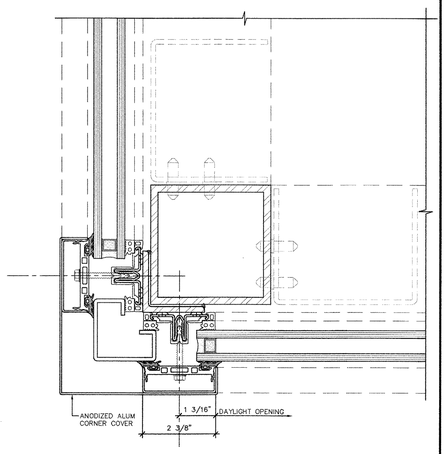
A8.72



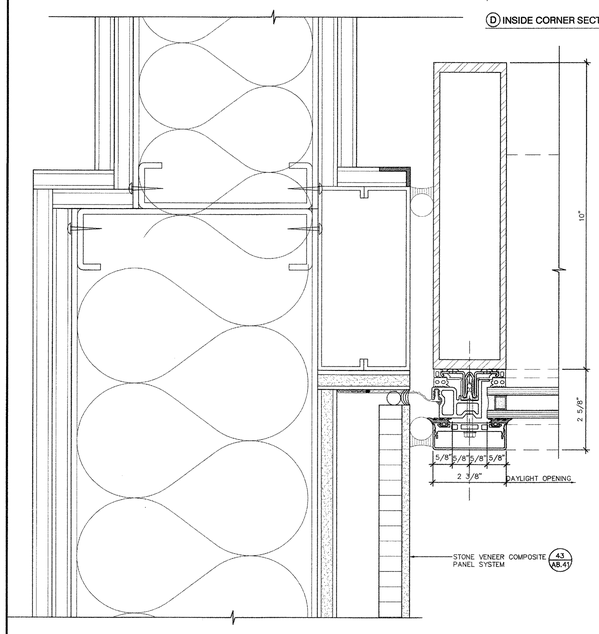
A VERTICAL MULLION SECTION : 6"



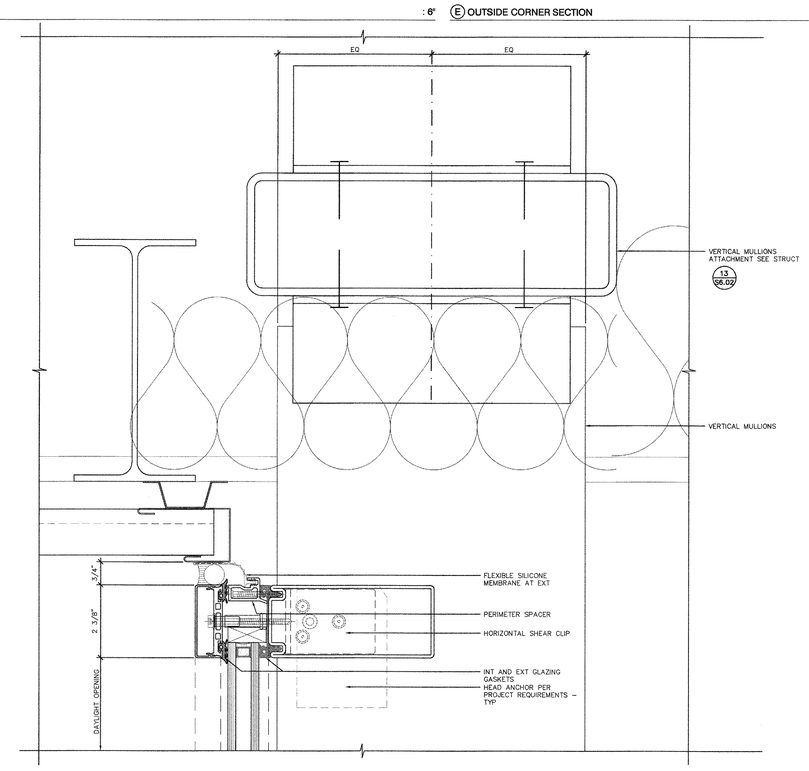
D INSIDE CORNER SECTION : 6"



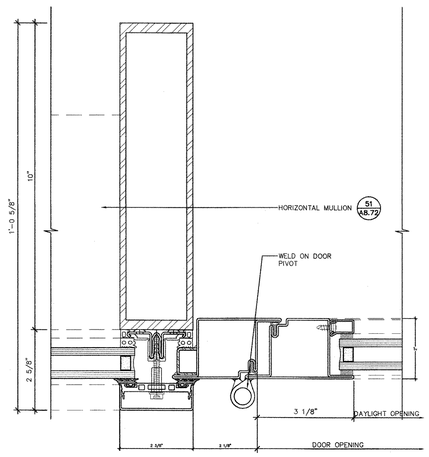
E OUTSIDE CORNER SECTION : 6"



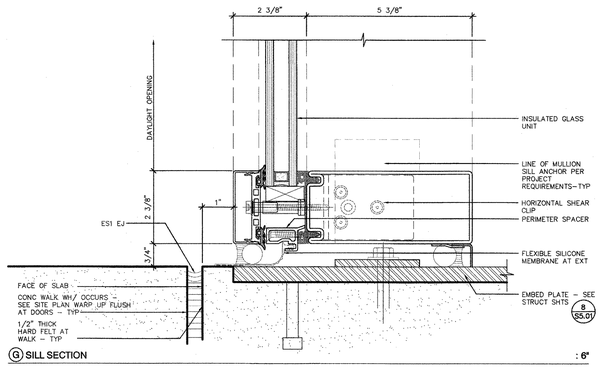
B JAMB SECTION : 6"



F HEAD SECTION : 6"

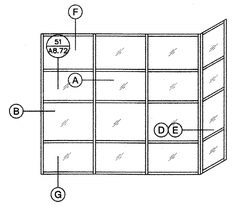


C DOOR JAMB AT HINGE : 6"



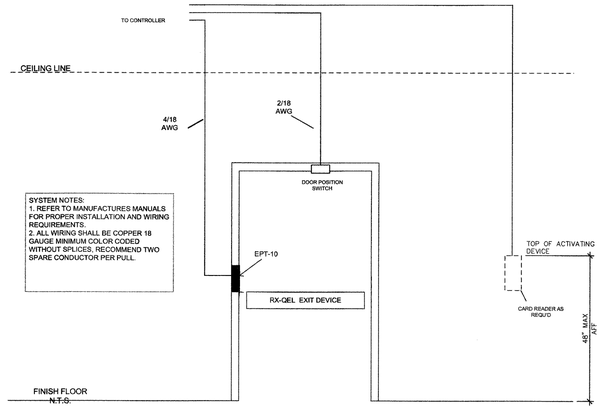
G SILL SECTION : 6"

NOTE:
1. CURTAIN WALL SYSTEM IS A DEFERRED APPROVAL ITEM.
2. DETAILS ARE SHOWN FOR BASES OF DESIGN.
3. SEE PROJECT MANUAL.



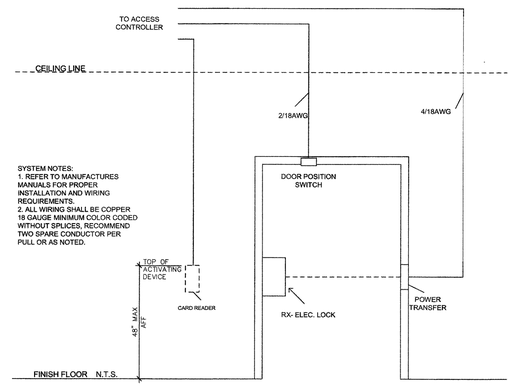
H KEY ISOMETRIC : NTS

51 CURTAIN WALL WINDOW : AS NOTED



25 ACCESS CONTROL - TYPICAL AT DOORS 503, 510D : NTS

A2.10



45 ACCESS CONTROL - TYPICAL AT DOORS 504, 504A, 506B, 520, 521 : NTS

A2.10

55 NOT USED

56 NOT USED

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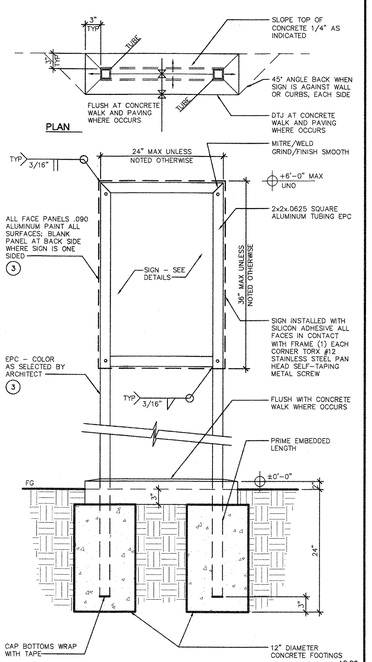
REVISIONS

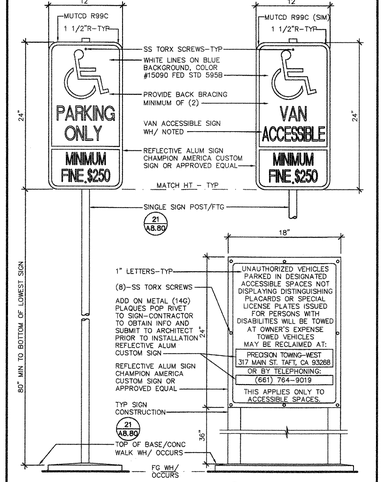
No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.73



21 TYPICAL SIGN CONSTRUCTION : 1"



A ACCESSIBLE PARKING SIGN (PAVING MARKING AND SIGN REQUIRED)

B TOW-AWAY SIGN

SIGN AND IDENTIFICATION:

1. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE THE STANDARD USE TO IDENTIFY FACILITIES THAT ARE ACCESSIBLE TO AND USABLE BY A PHYSICALLY DISABLED PERSON. THE SYMBOL SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL BE EQUAL TO COLOR NUMBER 15090 IN FEDERAL STANDARD 595B.
2. CHARACTERS AND SYMBOLS SHALL CONTRAST WITH THEIR BACKGROUND, EITHER LIGHT CHARACTERS ON DARK BACKGROUND, OR DARK CHARACTERS ON LIGHT BACKGROUND

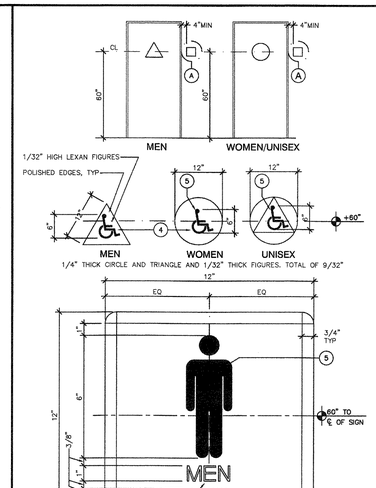
INTERNATIONAL SYMBOL OF ACCESSIBILITY NOTES:

1. POST A PERMANENT 18"x24" SIGN IN A CONSPICUOUS PLACE AT EACH ENTRANCE TO OFFSTREET PARKING FACILITIES WITH TOW-AWAY SIGN. SEE SITE PLAN FOR QUANTITY.
2. 3'x3' SURFACE INDENTIFICATION AT ALL ACCESSIBLE PARKING STALLS.

SIM 46, 49, 50

10-04-02M A2.00

22 ACCESSIBLE PARKING SIGNS : NTS



A DETAIL :3"

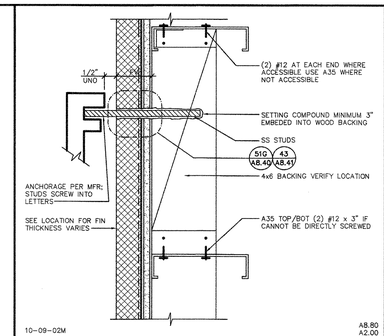
NOTE:

1. SEE DETAIL 54 A8.80 FOR ACCESSIBLE SIGN REQUIREMENTS
2. SEE DETAIL 56 A8.80 FOR TYPICAL SIGNAGE COLORS (*)
3. DOOR COLOR TO CONTRAST WITH ISA SIGNAGE
4. SEE DETAIL 31 A8.80 FOR TYPICAL DOOR SIGN INSTALLATION

28

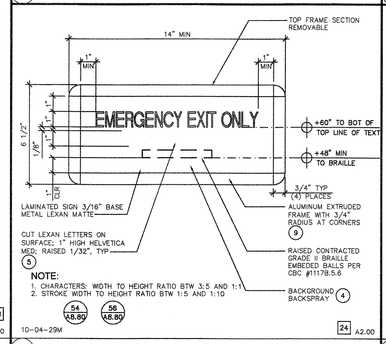
10-04-03M A2.00

23 TOILET IDENTITY SIGNS : NTS



10-09-02M A8.80 A2.00

14 LETTER BACKING : 3"

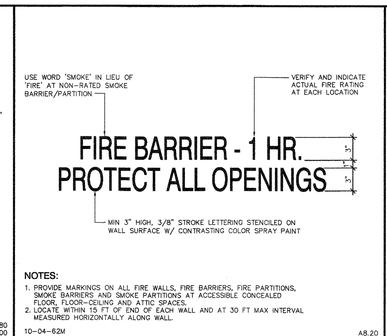


NOTE:

1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10

10-04-29M 24 A2.00

24 EMERGENCY EXIT ONLY SIGN : 3"

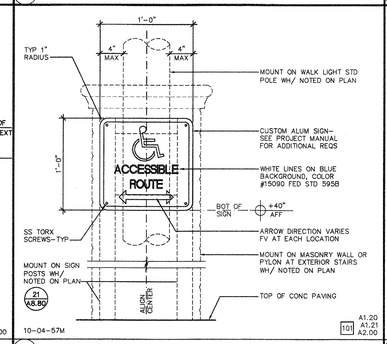


NOTES:

1. PROVIDE MARKINGS ON ALL FIRE WALLS, FIRE BARRIERS, FIRE PARTITIONS, SMOKE BARRIERS AND SMOKE PARTITIONS AT ACCESSIBLE CONCEALED FLOOR, FLOOR-CEILING AND ATTIC SPACES.
2. LOCATE WITHIN 15 FT OF END OF EACH WALL AND AT 30 FT MAX INTERVAL MEASURED HORIZONTALLY ALONG WALL.

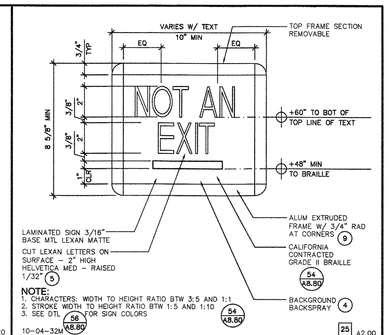
10-04-62M A8.20

15 FIRE/SMOKE BARRIER MARKING : 1.1/2"



10-04-57M 101 A1.20 A1.21 A2.00

25 ACCESSIBLE ROUTE SIGN : 1.1/2"



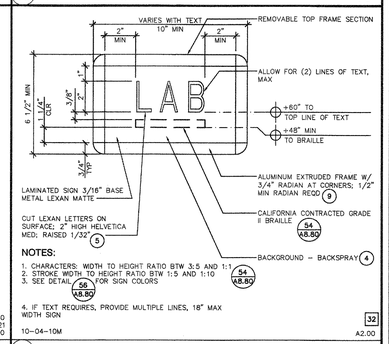
NOTE:

1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10
3. SEE DTL 56 A8.80 FOR SIGN COLORS

54 A8.80

10-04-32M 25 A2.00

16 NOT AN EXIT SIGN : 3"



NOTES:

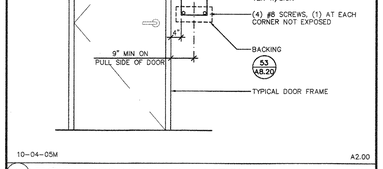
1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10
3. SEE DETAIL 56 A8.80 FOR SIGN COLORS
4. IF TEXT REQUIRES, PROVIDE MULTIPLE LINES, 18" MAX WIDTH SIGN

54 A8.80

32

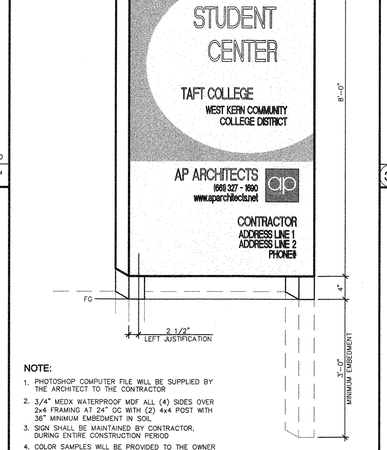
10-04-10M A2.00

26 ROOM SIGN : 3"



10-04-05M A2.00

31 TYPICAL DOOR SIGN INSTALLATION : 1/2"



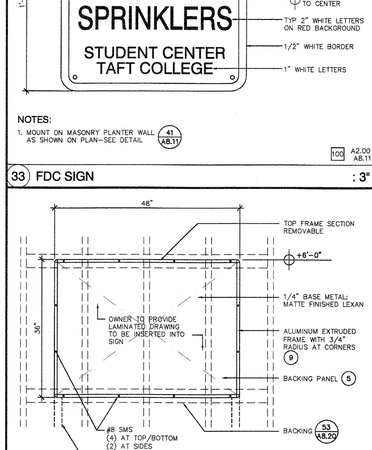
NOTE:

1. PHOTOSHOP COMPUTER FILE WILL BE SUPPLIED BY THE ARCHITECT TO THE CONTRACTOR
2. 3/4" MEDX WATERPROOF MDF ALL (4) SIDES OVER 2x4 FRAMING AT 24" OC WITH (2) 4x4 POST WITH 36" MINIMUM EMBEDMENT IN SOIL
3. SIGN SHALL BE MAINTAINED BY CONTRACTOR, DURING ENTIRE CONSTRUCTION PERIOD
4. COLOR SAMPLES WILL BE PROVIDED TO THE OWNER FOR APPROVAL PRIOR TO FABRICATION - ALLOW FOR MULTIPLE COLORS (5)
5. SIGN SHALL BECOME PROPERTY OF THE OWNER AND SHALL REMAIN OR BE REMOVED BY THE CONTRACTOR AT END OF JOB, OWNER'S OPTION

87

10-04-04M A2.00

42 PROJECT SIGN : 3/4"

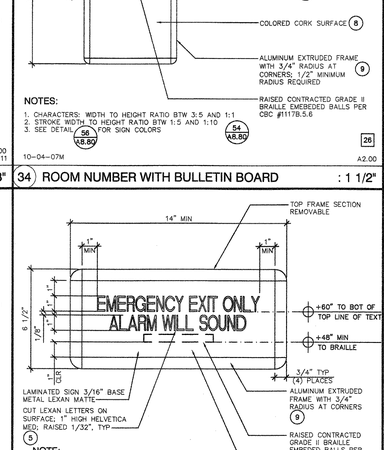


NOTES:

1. MOUNT ON MASONRY PLANTER WALL AS SHOWN ON PLAN-SEE DETAIL 41 A8.17

100 A2.00 A8.11

33 FDC SIGN : 3"



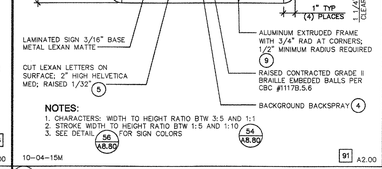
NOTES:

1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10
3. SEE DETAIL 56 A8.80 FOR SIGN COLORS

54 A8.80

10-04-07M A2.00

34 ROOM NUMBER WITH BULLETIN BOARD : 1 1/2"



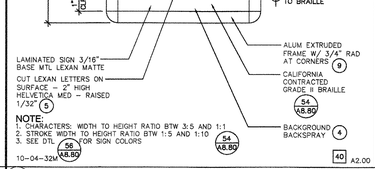
NOTES:

1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10
3. SEE DETAIL 56 A8.80 FOR SIGN COLORS

54 A8.80

91 A2.00

35 EXIT SIGN : 3"



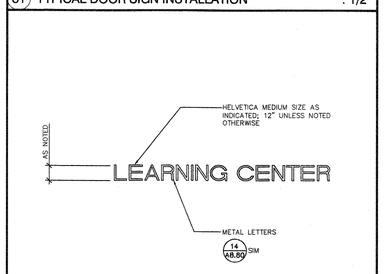
NOTE:

1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10
3. SEE DTL 56 A8.80 FOR SIGN COLORS

54 A8.80

10-04-32M 40 A2.00

36 EXIT ROUTE SIGN : 3"



NOTE:
SEE ELEVATIONS FOR ACTUAL TEXT, VERIFY WITH ARCHITECT

27

10-04-27 A2.00

41 TYPICAL BUILDING AND ROOM LETTERS : NTS

NOTE:
OWNER WILL PROVIDE CHANGEABLE PLAN SHEET TO BE INSERTED IN SIGN BELOW 1/4" LEXAN OVER BACKING SHEET-PROVIDED BY CONTRACTOR

34

10-04-17 A2.00

43 CAMPUS DIRECTORY - WALL MOUNT : 3/4"

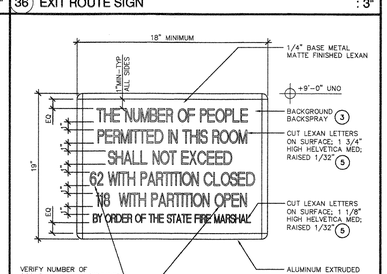
NOTE:

1. CHARACTERS: WIDTH TO HEIGHT RATIO BTW 3:5 AND 1:1
2. STROKE WIDTH TO HEIGHT RATIO BTW 1:5 AND 1:10

10-04-29 89 A2.00

44 EMERGENCY EXIT ONLY - ALARM WILL SOUND SIGN : 3"

45 NOT USED



36

10-04-18 A2.00

46 MAX OCCUPANCY SIGN : 1 1/2"

10-05-25M A2.00

51 TYPICAL ENTRANCE DOOR SIGNAGE : 1/2"

38

10-04-46 A2.00 A8.80 A8.00

52 ACCESSIBLE SIGN AT BUILDING : 3"

NOTE:
OWNER WILL PROVIDE CHANGEABLE PLAN SHEET TO BE INSERTED IN SIGN BELOW 1/4" LEXAN OVER BACKING SHEET

37

10-04-16M A2.00

53 BUILDING DIRECTORY : 3/4"

NOTE:

1. CHARACTER TYPE: CHARACTERS ON SIGNS SHALL BE RAISED 1/32" MINIMUM AND SHALL BE HELVETICA MEDIUM UPPERCASE CHARATERS ACCOMPANIED BY GRADE 2 CONTRACTED BRAILLE - SEE NOTE 5 BELOW
2. CHARACTER SIZE: RAISED CHARACTERS SHALL BE A MINIMUM OF 5/8" AND MAXIMUM OF 2" HIGH
3. FINISH AND CONTRAST: CONTRAST BETWEEN CHARACTERS, SYMBOLS AND THEIR BACKGROUND MUST BE 70% MINIMUM AND HAVE A NON-GLARE FINISH 1117B.5.2
4. PROPORTIONS: CHARACTERS ON SIGNS SHALL HAVE A WIDTH-TO-HEIGHT RATIO OF BETWEEN 3:5 AND 1:1 AND A STROKE WIDTH-HEIGHT RATIO BETWEEN 1:5 AND 1:10 1117B.5.6
5. BRAILLE: CALIFORNIA CONTRACTED GRADE 2 BRAILLE SHALL BE USED WHEREVER BRAILLE IS REQUIRED IN OTHER PORTIONS OF THESE STANDARDS; DOTS SHALL BE 1/10" ON CENTERS IN EACH CELL WITH 2/10" SPACE BETWEEN CELLS, MEASURED IN THE SECOND COLUMN OF DOTS IN THE FIRST CELL TO THE COLUMN OF DOTS IN THE SECOND CELL; DOTS SHALL BE RAISED A MINIMUM OF 1/40" ABOVE THE BACKGROUND 1117B.5.6
6. VISUAL CHARACTERS MAY BE SERIF OR SANS SERIF AND UPPER OR LOWER CASE CAN BE USED; CBC 1117B.5.4

10-04-40 A8.80

54 ACCESSIBLE SIGN REQUIREMENTS : NTS

10-04-49M A8.80

56 TYPICAL SIGN COLOR SCHEDULE - TC

TYPICAL FOR ALL DETAILS ON THIS SHEET

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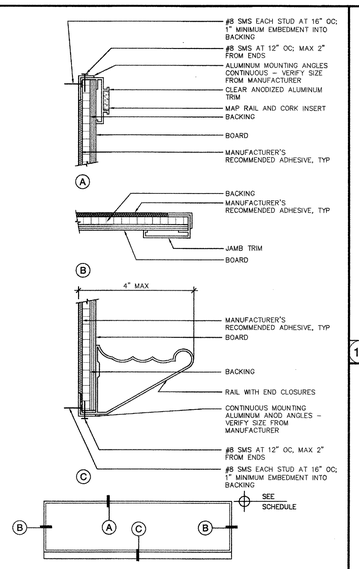
DETAILS

A8.80



	WALL	TYPE OF ANCHOR
A	STUD WITH GYPSUM BOARD	#8 x 2.1/4" AT 16" OC INTO STUDS. IF NO STUDS AT 16" OC PROVIDE BACKING

NOTE: ALL SCREWS TO BE SS PHILLIPS OVAL HEAD – U.N.O.

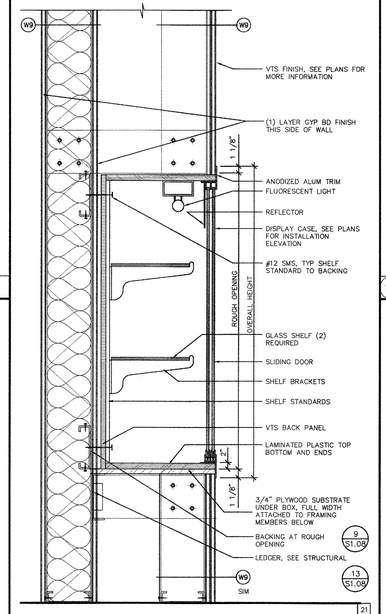
55

10-08-02 A2.00

21 VISUAL DISPLAY BOARD : NTS

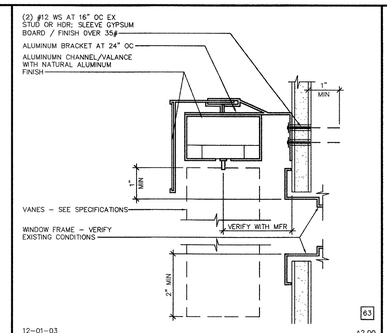
12 NOT USED

22 NOT USED



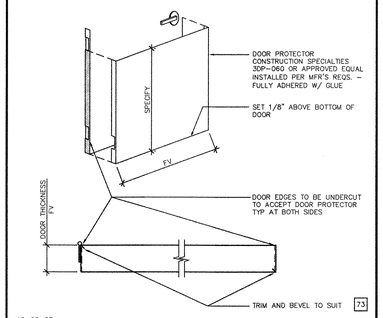
10-08-13 A2.00

23 DISPLAY CASE : 1 1/2"



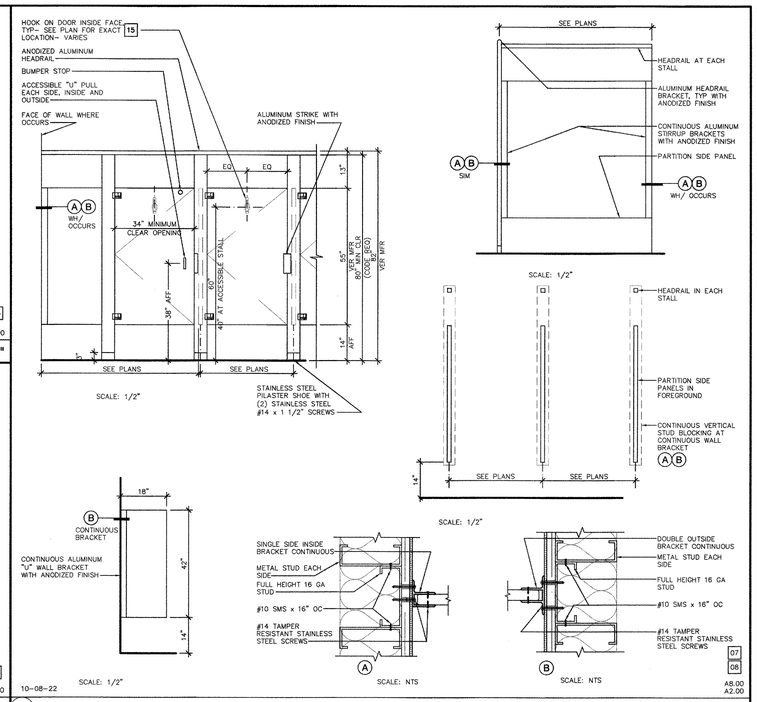
12-01-03 A2.00

14 VERTICAL BLINDS : 6"



10-08-27 A2.00

24 DOOR CART BUMPER RAIL : NTS



10-08-22 A8.00 A2.00

25 TYPICAL TOILET PARTITION DETAILS : AS NOTED

NOTE:
1. SCREEN BRACKET OVER 32": ADD (2)–#14 SMS EACH INCREMENT
2. PRODUCT: CHIEF MFG XTMU FUSION SERIES OPA–2518–10 170# MAX WT

103
102

10-06-10 A2.00

31 BACKING/BRACKET AT DIGITAL SIGN : 1.1/2"

MATTHEWS ARCHITECTURAL DIVISION BRONZE PLAQUE. SATIN FINISH RAISED LETTERS STIPPLE TEXTURE BACKGROUND DOUBLE LINE BORDER. CONCEALED FASTENING WITH EPOXY FILLER. 800–245–6574

42

10-04-34 A2.00

33 DEDICATION PLAQUE : NTS

–

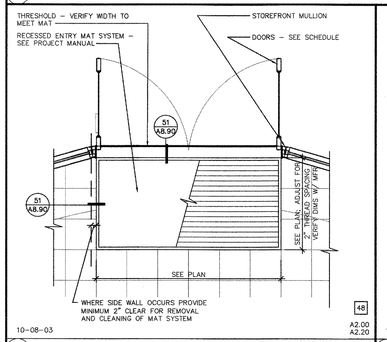
34 SS WALL GUARD : 3"

60

10-08-09 A2.00

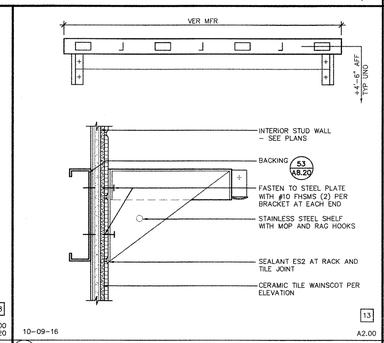
35 WALL GUARD : 3"

36 NOT USED



10-08-03 A2.00 A2.20

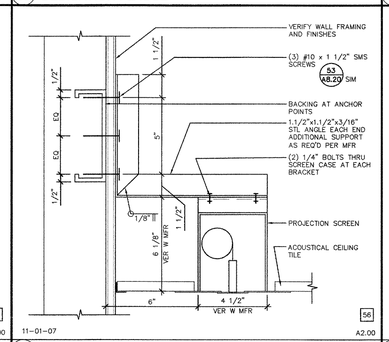
41 RECESSED ENTRY MAT : 1/2"



13

10-09-16 A2.00

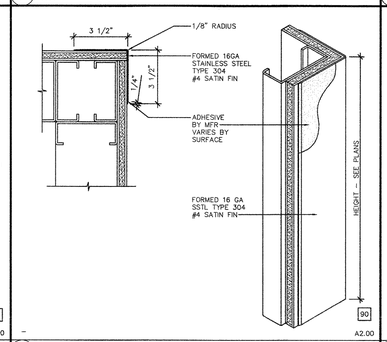
42 MOP RACK : AS NOTED



56

11-01-07 A2.00

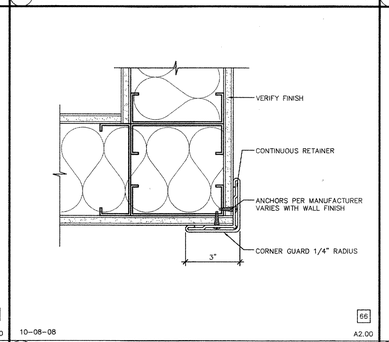
43 RECESSED MOTORIZED PROJECTION SCREEN : 3"



90

10-08-08 A2.00

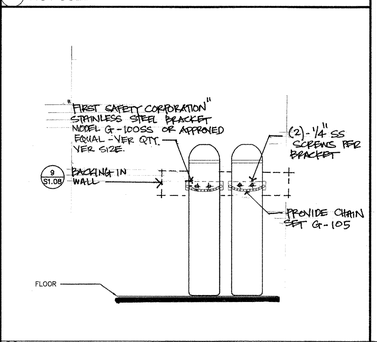
44 SSTL CORNER GUARD : 3"



66

10-08-08 A2.00

45 CORNER GUARD : NTS



46 CO2 TANK SUPPORT

10-08-04 A8.90

51 TYPICAL ENTRY MAT : 6"

61

10-08-06 A2.00

52 FIRE EXTINGUISHER : 1"

53 NOT USED

78

10-08-12 A2.00

54 SURFACE MTD FIRE EXTINGUISHER : 3"

TILE PER B417 TCNA REQUIREMENTS

–

A2.30

55 MOP BASIN : AS NOTED

ap architects
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web|www.aparchitects.net

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ARCHITECT

LICENSED ARCHITECT KEVIN COBB C 26729 REN 10-31-15 STATE OF CALIFORNIA

KEVIN COBB, AIA
ARCHITECT C-26729

CONSULTANT

DSA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
FILE NO. 15-C2
APP. NO. 03-115449
AC N/A FLS SS A45
DATE SEP 16 2015

PROJECT INFO

Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

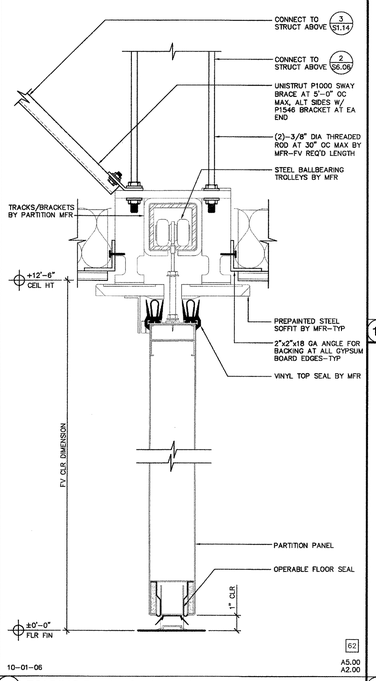
REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

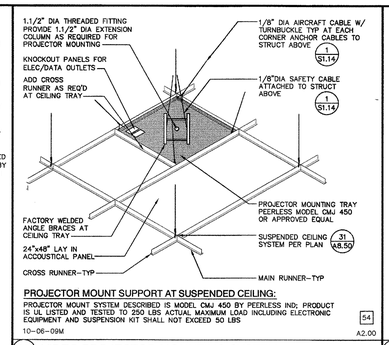
A8.90

11 NOT USED



21 NOT USED

22 FOLDING PARTITION HEAD/SILL : 1.1/2"



PROJECTOR MOUNT SUPPORT AT SUSPENDED CEILING:

PROJECTOR MOUNT SYSTEM DESCRIBED IS MODEL CMJ 450 BY PEERLESS IND; PRODUCT IS UL LISTED AND TESTED TO 250 LBS ACTUAL MAXIMUM LOAD INCLUDING ELECTRONIC EQUIPMENT AND SUSPENSION KIT SHALL NOT EXCEED 50 LBS

54

10-06-09M

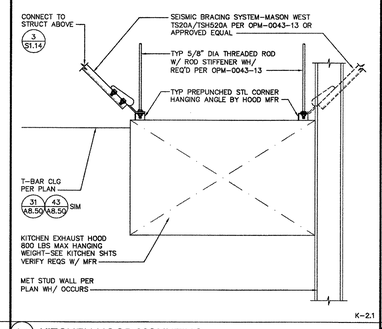
A2.00

13 VIDEO PROJECTOR MOUNTING SYSTEM : ISO

14 NOT USED

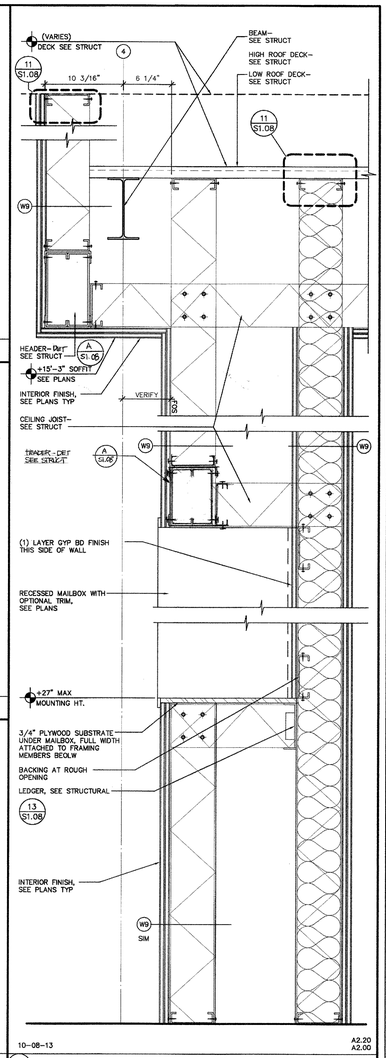
15 NOT USED

23 NOT USED



24 KITCHEN HOOD MOUNTING : 3/4"

25 NOT USED



10-08-13

A2.20
A2.00

36 MAILBOX : 1 1/2"

31 NOT USED

32 NOT USED

33 NOT USED

34 NOT USED

35 NOT USED

41 NOT USED

42 NOT USED

43 NOT USED

44 NOT USED

45 NOT USED

46 NOT USED

51 NOT USED

52 NOT USED

53 NOT USED

54 NOT USED

55 NOT USED

56 NOT USED

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REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.91

11 NOT USED

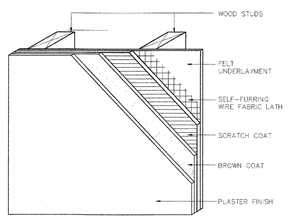
21 NOT USED

31 NOT USED

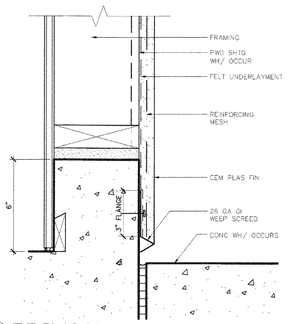
41 NOT USED

51 NOT USED

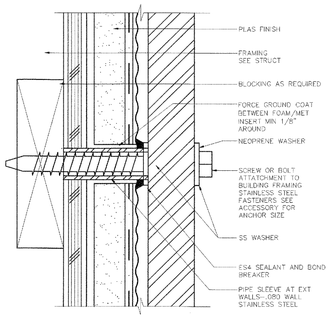
A NOT USED



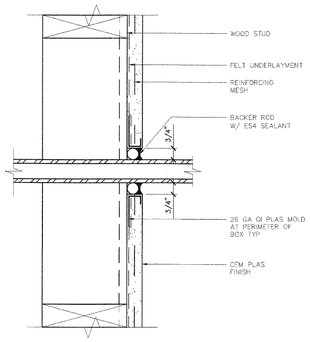
TYPICAL CEMENT PLASTER SYSTEM
B : ISO



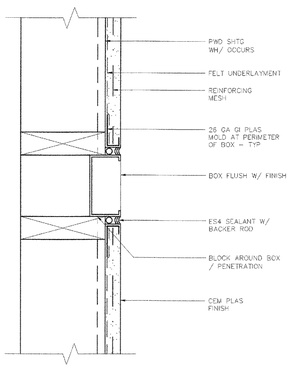
C TYP PLAS SILL : 3"



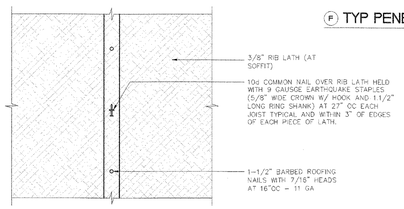
D TYP PENETRATION : 6"
SURFACE APPLIED ITEMS



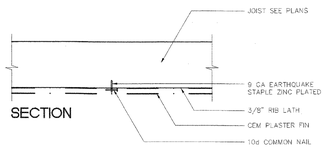
E TYP PIPE/CONDUIT PENETRATION : 3"



F TYP PENETRATION - BOX, SIM ITEMS : 3"

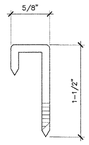


PLAN

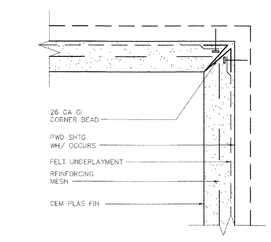


SECTION

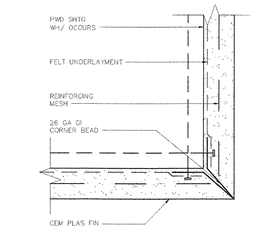
L TYP PLASTER AT SOFFIT : 1-1/2"



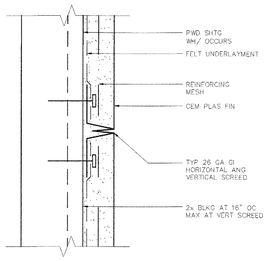
9 GA EARTHQUAKE STAPLE - ZINC PLATED : FS



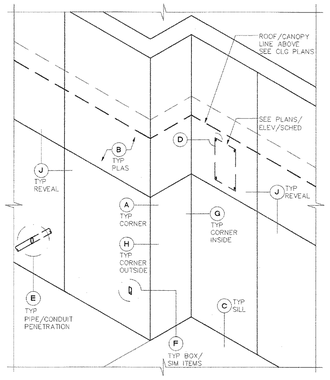
G TYP PLAS INSIDE CORNER DETAIL : 6"



H TYP PLAS OUTSIDE CORNER DETAIL : 6"

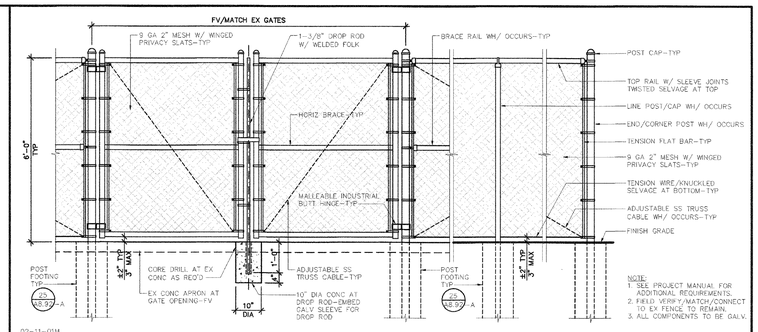


J TYP VERT PLAS SCREED (HORIZ SIM): 6"
PER MFR INTERSECTION WH/ OCCURS



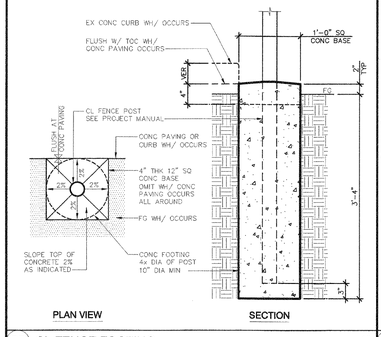
K KEY ELEV SHOWN FOR TYP CONDITIONS ONLY. SEE PLANS/ELEVS FOR APPLICABLE LOCATIONS : ISO

52 CEMENT PLASTER FINISH SYSTEM



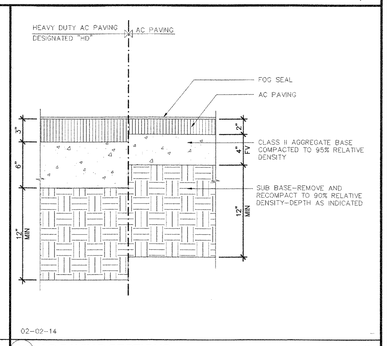
02-11-01M

15 CHAIN LINK FENCE/GATES : 1/2"



PLAN VIEW SECTION

25 CL FENCE FOOTING : 1"



02-02-14

26 AC PAVING SECTIONS : 1 1/2"

35 NOT USED

36 NOT USED

45 NOT USED

46 NOT USED

55 NOT USED

56 NOT USED

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Project No	430-0044
Drawn By	MS/SA
Checked By	JV
Date	09.01.2015

REVISIONS

No	Date	Item
1	00.00.00	DESCRIPTION

DETAILS

A8.92-A

Appendix E: FDS File for Design Fire A

```
&HEAD CHID='PROJECT MODEL Simulation 1', TITLE='OFFICE FIRE SIMULATION' /
=====Compartment Configuration=====
*Book Store*
&MESH XB= -2.0,4.6, 0.0, 3.6, 0.0, 4.0, IJK = 33,18,20 /
*West Wall*
&OBST XB= 0.0, 0.0, 0.0 , 3.6 , 0.0, 4.0, SURF_ID='WALL'/
*Door*
&HOLE XB= -0.1, 0.1, 2.6, 3.5, 0.0, 2.4 /
*Opening to Lounge/Game Area*
&VENT XB = 0.0,-2.0, 0.0, 0.0, 0.0, 4.0 , SURF_ID='OPEN'/
&VENT XB = -2.0,0.0, 3.6, 3.6, 0.0, 4.0 , SURF_ID='OPEN'/
&VENT XB = -2.0,-2.0, 0.0, 3.6, 0.0, 4.0 , SURF_ID='OPEN'/
&VENT XB = -2.0,0.0, 0.0, 3.6, 4.0, 4.0  , SURF_ID='OPEN'/
======Model Misc Details======
&TIME  T_END= 600. /
&MISC TMPA=21. /
&DUMP DT_CTRL=0.5, DT_HRR=1., DT_DEVC=1., SIG_FIGS=3 /
=========Products of Combustion======
***Reference SFPE Handbook Table A.39 and SFPE Handbook Figure 62.20 for
soot & CO yield***
&REAC ID='CELLULOSE',
    FYI='C_6 H_10 N O_25',
    FUEL='REAC_FUEL',
    C=6.0,
    H=10.0,
    O=5.0,
    CO_YIELD=0.01,
    SOOT_YIELD=0.015 /
```

=========Fire Sprinkler======

&PROP ID = 'SPK'

QUANTITY = 'SPRINKLER LINK TEMPERATURE'

ACTIVATION_TEMPERATURE= 68.3

RTI = 50.0

C_FACTOR = 0.0

FLOW_RATE = 0.0 /

========

= Fire =

========

***Reference for HRR: "Heat Release Rates of

Burning Items in Fires" by Kim and Lilley***

Wastebasket

&OBST XB= 3.9,4.5, 0.2, 0.8, 0.0,0.6 ,COLOR ='GREEN' /

&VENT XB= 3.9,4.5, 0.2, 0.8, 0.6,0.6, SURF_ID='fire', IOR=3 /

&SURF ID='fire', HRRPUA=933, RAMP_Q='fireramp', COLOR='RED' /

Growth

&RAMP ID='fireramp', T=0.0, F=0.000 /

&RAMP ID='fireramp', T=10.0, F=0.04 /

&RAMP ID='fireramp', T=20.0, F=0.014 /

&RAMP ID='fireramp', T=30.0, F=0.032 /

&RAMP ID='fireramp', T=40.0, F=0.052 /

&RAMP ID='fireramp', T=50.0, F=0.089 /

&RAMP ID='fireramp', T=60.0, F=0.129 /

&RAMP ID='fireramp', T=70.0, F=0.175 /

&RAMP ID='fireramp', T=80.0, F=0.223 /

&RAMP ID='fireramp', T=90.0, F=0.289 /

&RAMP ID='fireramp', T=100.0, F=0.357 /

&RAMP ID='fireramp', T=110.0, F=0.432 /

&RAMP ID='fireramp', T=120.0, F=0.514 /

```
&RAMP ID='fireramp', T=130.0, F=0.604 /
&RAMP ID='fireramp', T=140.0, F=0.700 /
&RAMP ID='fireramp', T=150.0, F=0.804 /
&RAMP ID='fireramp', T=160.0, F=0.914 /
&RAMP ID='fireramp', T=170.0, F=1.00 /
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&RAMP ID='fireramp', T=250.0, F=0.00 /
&RAMP ID='fireramp', T=400.0, F=0.0 /
=======Room Materials======
&SURF ID='WALL', MATL_ID='K-LITE HTZ','GYPSUM', THICKNESS=0.025,0.012, RGB = 245,222,179,
DEFAULT=.TRUE. /
&SURF ID='STEEL SHEET', MATL_ID='STEEL','K-LITE HTZ', THICKNESS=0.00635,0.025, COLOR='BLACK' /
&SURF ID='CONCRETE', MATL_ID='CONCRETE', THICKNESS=0.3, COLOR='GRAY 40'/
&VENT PBZ=0.0, SURF_ID='CONCRETE'/
&MATL ID          = 'GYPSUM'
    CONDUCTIVITY  = 0.16
    SPECIFIC_HEAT = 0.9     DENSITY      = 790. /
&MATL ID          = 'STEEL'
    FYI           = 'Quintiere, Fire Behavior'
    SPECIFIC_HEAT = 0.77
    EMISSIVITY    = 0.8
    DENSITY       = 7800.
    CONDUCTIVITY  = 45. /
```

```
&MATL ID           = 'CONCRETE'
    FYI          = 'Quintiere, Fire Behavior'
    SPECIFIC_HEAT = 0.88
    DENSITY      = 2100.
    CONDUCTIVITY  = 1.0 /
&MATL ID           = 'K-LITE HTZ'
    FYI          = 'INSWOOL HTZ for k and WEBBOOK for c'
    EMISSIVITY    = 0.95
    DENSITY      = 128.
    CONDUCTIVITY_RAMP  = 'K-LITE HTZ k'
    SPECIFIC_HEAT_RAMP = 'K-LITE HTZ c'/
&RAMP ID='K-LITE HTZ k', T = 316.0, F = 0.06/
&RAMP ID='K-LITE HTZ k', T = 538.0, F = 0.09/
&RAMP ID='K-LITE HTZ k', T = 760.0, F = 0.12/
&RAMP ID='K-LITE HTZ k', T = 871.0, F = 0.14/
&RAMP ID='K-LITE HTZ c', T = 24.9, F = 0.706/
&RAMP ID='K-LITE HTZ c', T = 26.9, F = 0.709/
&RAMP ID='K-LITE HTZ c', T = 126.9, F = 0.848/
&RAMP ID='K-LITE HTZ c', T = 226.9, F = 0.937/
&RAMP ID='K-LITE HTZ c', T = 326.9, F = 1.001/
&RAMP ID='K-LITE HTZ c', T = 426.9, F = 1.055/
&RAMP ID='K-LITE HTZ c', T = 526.9, F = 1.111/
&RAMP ID='K-LITE HTZ c', T = 573.9, F = 1.059/
&RAMP ID='K-LITE HTZ c', T = 626.9, F = 1.069/
&RAMP ID='K-LITE HTZ c', T = 726.9, F = 1.086/
&RAMP ID='K-LITE HTZ c', T = 826.9, F = 1.102/
&RAMP ID='K-LITE HTZ c', T = 926.9, F = 1.118/
&RAMP ID='K-LITE HTZ c', T = 1026.9, F = 1.132/
&RAMP ID='K-LITE HTZ c', T = 1126.9, F = 1.146/
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&RAMP ID='K-LITE HTZ c', T = 1204.9, F = 1.149/

&RAMP ID='K-LITE HTZ c', T = 1226.9, F = 1.152/

&RAMP ID='K-LITE HTZ c', T = 1326.9, F = 1.164/

&RAMP ID='K-LITE HTZ c', T = 1426.9, F = 1.175/

&RAMP ID='K-LITE HTZ c', T = 1526.9, F = 1.187/

&RAMP ID='K-LITE HTZ c', T = 1626.9, F = 1.198/

====SPRINKLER PLACEMENT=======

&DEVC XYZ = 1.65, 1.8, 4.0, PROP_ID = 'SPK', ID = '1.65,1.8' /

&DEVC XYZ = 3.95, 1.8, 4.0, PROP_ID = 'SPK', ID = '3.95,1.8' /

=======Measurements======

&DEVC XB=2.3,2.3,1.8,1.8,0.0,6.0, QUANTITY='LAYER HEIGHT', ID = 'Smoke Layer Hieght Center of Room505'/

&DEVC XYZ = 3.9, -1.0, 1.8, QUANTITY = 'DENSITY', SPEC_ID='SOOT', ID = 'Soot Density 1m Into EastVest'

&DEVC XYZ = 3.9, -1.0, 1.8, QUANTITY = 'MASS FRACTION', SPEC_ID='CARBON MONOXIDE', ID = 'CO 1m Into EastVest' /

&SLCF PBX=1.0, QUANTITY='DENSITY',SPEC_ID='SOOT' /

&SLCF PBX=-1.0, QUANTITY='DENSITY',SPEC_ID='SOOT' /

&SLCF PBZ=1.8, QUANTITY='DENSITY',SPEC_ID='SOOT' /

&SLCF QUANTITY='MASS FRACTION', SPEC_ID='CARBON MONOXIDE', PBZ= 1.8, ID = 'CO AT 1.8 METERS'/

&SLCF QUANTITY='MASS FRACTION', SPEC_ID='CARBON MONOXIDE', PBX= 0.25, ID = 'CO Near Doorway'/

&SLCF QUANTITY='TEMPERATURE', PBZ= 1.8/

&SLCF QUANTITY='TEMPERATURE', PBX=0.25/

&SLCF QUANTITY='TEMPERATURE', PBY=3.0/

&DEVC ID='heat flux center of room 1.8 m high', QUANTITY='RADIATIVE HEAT FLUX GAS', XYZ=2.3,1.8,0.1, ORIENTATION=-1,0,0 /

&SLCF PBX=2.3, QUANTITY='HRRPUV'/

&BNDF QUANTITY='WALL TEMPERATURE' /

&TAIL /

Appendix F: FDS File for Design Fire B

```
&HEAD CHID='PROJECT MODEL Simulation 1 spk', TITLE='BOOK STORE FIRE SIMULATION 1' /
=====Compartment Configuration=====
*Book Store*
&MESH XB= 0.0,11.0, -2.0, 11.0, 0.0, 6.0, IJK = 55,65,30 /
*Delivery*
&MESH XB= 0.0, 10.0, 11.0, 21.0, 0.0, 4.0, IJK = 50,50,20 /
*Delivery Area Wall*
&OBST XB= 5.0, 11.0, 11.0 , 11.0 , 0.0, 4.0, SURF_ID='WALL'/
*East Entry Vestibule Wall*
&OBST XB=0.0, 11.0, 0.0, 0.0, 0.0, 6.0, SURF_ID='WALL'/
*East Entry Vestible Doorway in Bookstore*
&HOLE XB= 3.0, 4.83, -0.2, 0.1, 0.0, 2.4 /
*East Entry Vestibule Vent Into Game Area*
&VENT XB = 0.0,0.0, -2.0, 0.0, 0.0, 6.0, SURF_ID = 'OPEN' /
======Model Misc Details======
&TIME  T_END= 1100. /
&MISC TMPA=21. /
&DUMP DT_CTRL=0.5, DT_HRR=1., DT_DEVC=1., SIG_FIGS=3 /
=========Products of Combustion======
***Reference SFPE Handbook Table A.39 and SFPE Handbook Figure 62.20 for
soot & CO yield***
&REAC ID='CELLULOSE',
    FYI='C_6 H_10 N O_25',
    FUEL='REAC_FUEL',
    C=6.0,
    H=10.0,
    O=5.0,
    CO_YIELD=0.01,
    SOOT_YIELD=0.015 /
```

=========Fire Sprinkler======

&PROP ID = 'SPK'

QUANTITY = 'SPRINKLER LINK TEMPERATURE'

ACTIVATION_TEMPERATURE= 68.3

RTI = 50.0

C_FACTOR = 0.0

FLOW_RATE = 0.0 /

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= Fire =

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***Reference for HRR: "Quick Response Sprnklers in Office

Configurations: Fire Test Results" by US DEPT of COmmerce**

Book Cases

&OBST XB= 10.53,10.99, 5.09, 6.0, 0.0,1.2 ,COLOR ='GRAY' /

&OBST XB= 10.53,10.99, 6.10, 7.0, 0.0,1.2 , COLOR ='GRAY' /

&VENT XB= 10.53,10.99, 5.09,7.0, 1.20,1.20, SURF_ID='fire', IOR=3 /

&SURF ID='fire', HRRPUA=3186, RAMP_Q='fireramp', COLOR='RED' /

Growth

&RAMP ID='fireramp', T=0.0, F=0.000 /

&RAMP ID='fireramp', T=10.0, F=0.001 /

&RAMP ID='fireramp', T=20.0, F=0.004 /

&RAMP ID='fireramp', T=30.0, F=0.010 /

&RAMP ID='fireramp', T=40.0, F=0.018 /

&RAMP ID='fireramp', T=50.0, F=0.028 /

&RAMP ID='fireramp', T=60.0, F=0.040 /

&RAMP ID='fireramp', T=70.0, F=0.054 /

&RAMP ID='fireramp', T=80.0, F=0.071 /

&RAMP ID='fireramp', T=90.0, F=0.090 /

&RAMP ID='fireramp', T=100.0, F=0.111 /

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&RAMP ID='fireramp', T=110.0, F=0.134 /

&RAMP ID='fireramp', T=120.0, F=0.160 /

&RAMP ID='fireramp', T=1210.0, F=0.160 /

=======Room Materials======

&SURF ID='WALL', MATL_ID='K-LITE HTZ','GYPSUM', THICKNESS=0.025,0.012, RGB = 245,222,179,
DEFAULT=.TRUE. /

&SURF ID='STEEL SHEET', MATL_ID='STEEL','K-LITE HTZ', THICKNESS=0.00635,0.025, COLOR='BLACK' /

&SURF ID='CONCRETE', MATL_ID='CONCRETE', THICKNESS=0.3, COLOR='GRAY 40'/

&VENT PBZ=0.0, SURF_ID='CONCRETE'/

&MATL ID          = 'GYPSUM'
    CONDUCTIVITY  = 0.16
    SPECIFIC_HEAT = 0.9
    DENSITY       = 790. /
&MATL ID          = 'STEEL'
    FYI           = 'Quintiere, Fire Behavior'
    SPECIFIC_HEAT = 0.77
    EMISSIVITY    = 0.8
    DENSITY       = 7800.
    CONDUCTIVITY  = 45. /
&MATL ID          = 'CONCRETE'
    FYI           = 'Quintiere, Fire Behavior'
    SPECIFIC_HEAT = 0.88
    DENSITY       = 2100.
    CONDUCTIVITY  = 1.0 /
&MATL ID          = 'K-LITE HTZ'
    FYI           = 'INSWOOL HTZ for k and WEBBOOK for c'
    EMISSIVITY    = 0.95
    DENSITY       = 128.
    CONDUCTIVITY_RAMP  = 'K-LITE HTZ k'
    SPECIFIC_HEAT_RAMP = 'K-LITE HTZ c'/
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&RAMP ID='K-LITE HTZ k', T = 316.0, F = 0.06/
&RAMP ID='K-LITE HTZ k', T = 538.0, F = 0.09/
&RAMP ID='K-LITE HTZ k', T = 760.0, F = 0.12/
&RAMP ID='K-LITE HTZ k', T = 871.0, F = 0.14/
&RAMP ID='K-LITE HTZ c', T = 24.9, F = 0.706/
&RAMP ID='K-LITE HTZ c', T = 26.9, F = 0.709/
&RAMP ID='K-LITE HTZ c', T = 126.9, F = 0.848/
&RAMP ID='K-LITE HTZ c', T = 226.9, F = 0.937/
&RAMP ID='K-LITE HTZ c', T = 326.9, F = 1.001/
&RAMP ID='K-LITE HTZ c', T = 426.9, F = 1.055/
&RAMP ID='K-LITE HTZ c', T = 526.9, F = 1.111/
&RAMP ID='K-LITE HTZ c', T = 573.9, F = 1.059/
&RAMP ID='K-LITE HTZ c', T = 626.9, F = 1.069/
&RAMP ID='K-LITE HTZ c', T = 726.9, F = 1.086/
&RAMP ID='K-LITE HTZ c', T = 826.9, F = 1.102/
&RAMP ID='K-LITE HTZ c', T = 926.9, F = 1.118/
&RAMP ID='K-LITE HTZ c', T = 1026.9, F = 1.132/
&RAMP ID='K-LITE HTZ c', T = 1126.9, F = 1.146/
&RAMP ID='K-LITE HTZ c', T = 1204.9, F = 1.149/
&RAMP ID='K-LITE HTZ c', T = 1226.9, F = 1.152/
&RAMP ID='K-LITE HTZ c', T = 1326.9, F = 1.164/
&RAMP ID='K-LITE HTZ c', T = 1426.9, F = 1.175/
&RAMP ID='K-LITE HTZ c', T = 1526.9, F = 1.187/
&RAMP ID='K-LITE HTZ c', T = 1626.9, F = 1.198/
====SPRINKLER PLACEMENT=======
&DEVC XYZ = 2.0, 3.0, 6.0, PROP_ID = 'SPK', ID = '2,3' /
&DEVC XYZ = 4.0, 3.0, 6.0, PROP_ID = 'SPK', ID = '4,3' /
&DEVC XYZ = 6.0, 3.0, 6.0, PROP_ID = 'SPK', ID = '6,3' /
&DEVC XYZ = 8.0, 3.0, 6.0, PROP_ID = 'SPK', ID = '8,3' /
&DEVC XYZ = 10.0, 3.0, 6.0, PROP_ID = 'SPK', ID = '10,3' /
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&DEVC XYZ = 2.0, 6.0, 6.0, PROP_ID = 'SPK', ID = '2,6' /

&DEVC XYZ = 4.0, 6.0, 6.0, PROP_ID = 'SPK',ID = '4,6' /

&DEVC XYZ = 6.0, 6.0, 6.0, PROP_ID = 'SPK', ID = '6,6' /

&DEVC XYZ = 8.0, 6.0, 6.0, PROP_ID = 'SPK', ID = '8,6' /

&DEVC XYZ = 10.0, 6.0, 6.0, PROP_ID = 'SPK', ID = '10,6' /

&DEVC XYZ = 2.0, 9.0, 6.0, PROP_ID = 'SPK', ID = '2,9' /

&DEVC XYZ = 4.0, 9.0, 6.0, PROP_ID = 'SPK', ID = '4,9' /

&DEVC XYZ = 6.0, 9.0, 6.0, PROP_ID = 'SPK',ID = '6,9' /

&DEVC XYZ = 8.0, 9.0, 6.0, PROP_ID = 'SPK',ID = '8,9' /

&DEVC XYZ = 10.0, 9.0, 6.0, PROP_ID = 'SPK',ID = '10,9' /

=======Measurements======

&DEVC XB=6.0,6.0,6.0,6.0,0.0,6.0, QUANTITY='LAYER HEIGHT', ID = 'Smoke Layer Hieght Center of Bookstore'/

&DEVC XB=6.0,6.0,-1.0,-1.0,0.0,6.0, QUANTITY='LAYER HEIGHT', ID = 'Smoke Layer Hieght Center of East Vestibule'/

&DEVC XYZ = 3.9, -1.0, 1.8, QUANTITY = 'DENSITY', SPEC_ID='SOOT', ID = 'Soot Density 1m Into EastVest'

&DEVC XYZ = 3.9, -1.0, 1.8, QUANTITY = 'MASS FRACTION', SPEC_ID='CARBON MONOXIDE', ID = 'CO 1m Into EastVest' /

&SLCF PBX=1.0, QUANTITY='DENSITY',SPEC_ID='SOOT' /

&SLCF PBY=-1.0, QUANTITY='DENSITY',SPEC_ID='SOOT' /

&SLCF PBZ=1.8, QUANTITY='DENSITY',SPEC_ID='SOOT' /

&SLCF QUANTITY='MASS FRACTION', SPEC_ID='CARBON MONOXIDE', PBZ= 1.8, ID = 'CO AT 1.8 METERS'/

&SLCF QUANTITY='MASS FRACTION', SPEC_ID='CARBON MONOXIDE', PBY= -0.5, ID = 'CO 0.5 METERS INTO VESTIBULE'/

&SLCF QUANTITY='TEMPERATURE', PBZ= 1.8/

&SLCF QUANTITY='TEMPERATURE', PBX=6.0/

&SLCF QUANTITY='TEMPERATURE', PBY=6.0/

&SLCF QUANTITY='TEMPERATURE', PBZ= 1.8/

&SLCF QUANTITY='TEMPERATURE', PBX=6.0/

&SLCF QUANTITY='TEMPERATURE', PBY=6.0/

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&DEVC ID='heat flux center of room 1.8 m high', QUANTITY='RADIATIVE HEAT FLUX GAS',
XYZ=6.0,6.0,1.8, ORIENTATION=-1,0,0 /

&DEVC ID='heat flux center of room 0.1 m high', QUANTITY='RADIATIVE HEAT FLUX GAS',
XYZ=6.0,6.0,0.1, ORIENTATION=-1,0,0 /

&SLCF PBX=1.2, QUANTITY='HRRPUV'/

&BNDF QUANTITY='WALL TEMPERATURE' /

&TAIL /
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