FIRE ACCESS ROADWAYS

PERMANENT FIRE ACCESS ROADWAYS SHALL MEET CITY OF LONG BEACH ENGINEERING STANDARDS AND FIRE DISTRICT STANDARDS. ALL WEATHER SURFACES OTHER THAN PAVING MUST BE APPROVED BY THE FIRE DISTRICT ON 1. MINIMUM SUBGRADE COMPACTION UNDER FIRE LANE IS 95%.

2. MINIMUM UNOBSTRUCTED VERTICAL CLEARANCE IS 15-FEET.

A) EMERGENCY VEHICLE ACCESS ROADWAY REQUIREMENTS

- 1. Most emergency vehicle access roadways shall have a minimum unobstructed width of 26 feet and clear height of 15' with a minimum 28-foot interior turning radius, 45-foot exterior turning radius.
- 2. Tapers between 14' & 20' widths shall be 3' to 12' each side.3. Roadways shall have an all weather driving surface per City of Long Beach standards. It shall be in place and able to support the weight of fire department vehicles (80,000 lbs, and outrigger point loading of 45,000 lbs) prior to the delivery, use, or storage of combustible building materials to or at the site except small amounts used for concrete form. Approved alternate surfaces, if any, shall be installed to a minimum of manufacturer's specifications City of Long Beach Standard details.
- 4. Fire apparatus access roadways must be within 150 feet of all portions of the exterior walls of a building and within 50 feet of at least 25% of the exterior walls of a building.
 5. Fire lanes must be marked per Long Beach Fire Department standards. Fire lanes identified through site plan review shall be included on civil drawings. Additional fire lanes or marking may be required anytime during the life of the development upon evaluation by and direction of the Fire Marshal.
- 6. The fire apparatus access roadway shall have a maximum grade of 10%. If off site access grades or on site grades are 11% or more, a design (plan and profile) of the proposed roadways must be submitted during Technical Committee review showing the extent and degree of overage in order to determine the mitigation which may be required or whether
- construction is not possible. Dead end access roads for commercial projects shall not exceed 150 feet without a turnaround per City of Long Beach standards. When single family dwelling units are served by dead end access longer than 300' measured from the closest intersection then there
- shall be provided a turnaround per City of Long Beach standards.

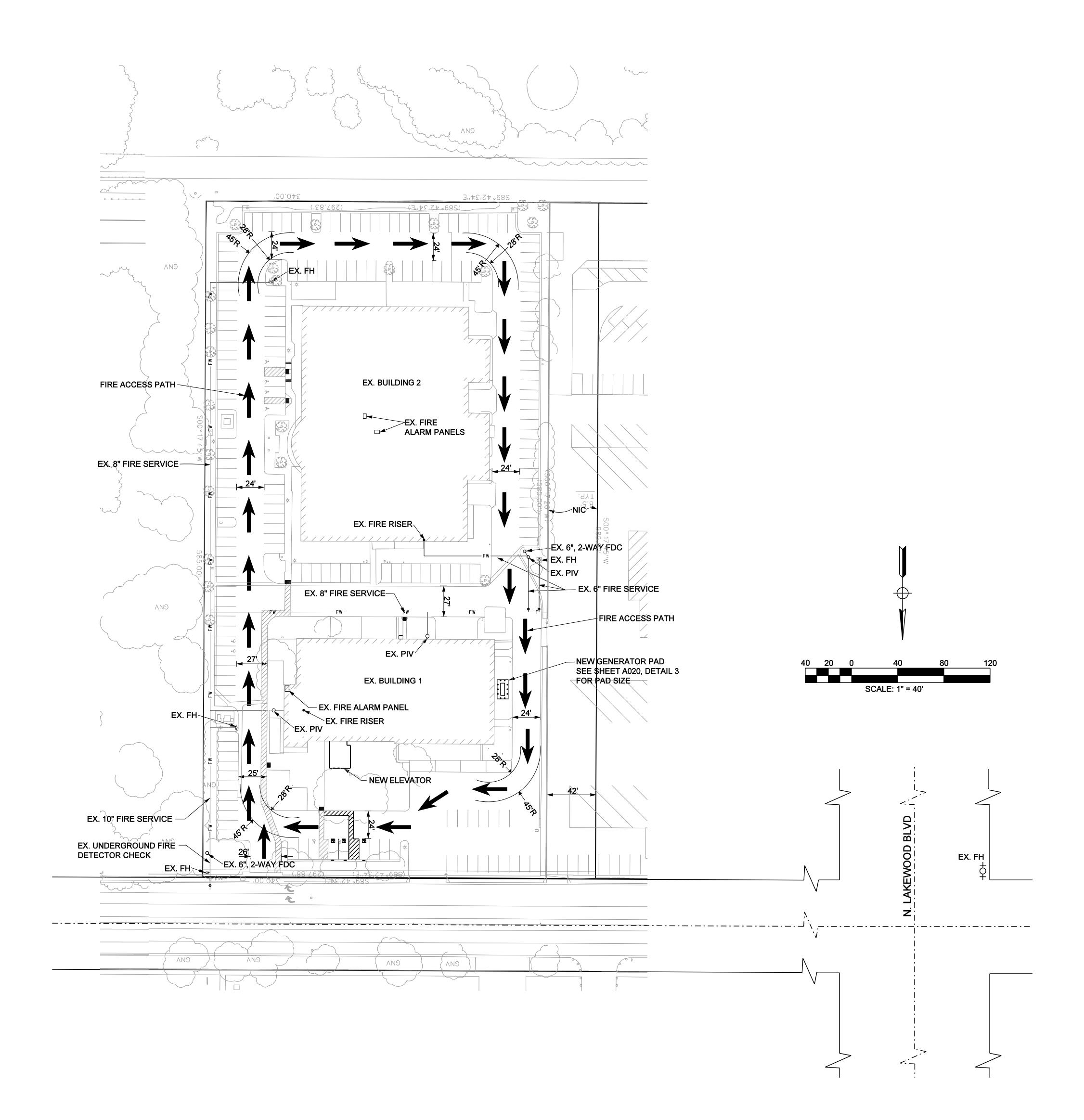
 8. Where desired, design of an "emergency vehicle use only" access must be approved by the Fire Department. Where a gate is desired for fire apparatus access roadway serving residential property of large commercial property, there shall be strobe activated electric gate with key and manual overrides. The Fire Marshal shall determine if alternate devices may be used or what will be used in other situations.

B) WATER SUPPLY & HYDRANTS

- 1. Maximum hydrant spacing is 300 feet on center for commercial or multi-family; 600 feet on center for surface parking lots and single family residential.
- 2. Hydrants must provide sufficient fire flow to meet the required fire flow as calculated by
- the Fire Department. 3. Where structures on a dead end access are over 150 feet from a hydrant, an additional hydrant may be placed within 150 feet and placed in ralation to the overal development
- and existing hydrant layout. 4. Hydrants, F.D.C.'s, PIV's and water mains must be shown on the entitlement and civil
- drawings and approved by the water purveyor and Fire Marshal. 5. Hydrants must be in place and serviceable prior to the delivery, use, or storage of
- combustible building materials. If construction is non-combustible, hydrants shall be in place and serviceable prior to raising walls.

SCOPE OF WORK

CONSTRUCT A NEW ELEVATOR FOR BUILDING 1 AND OVERALL SITE ADA PARKING AND RAMP UPGRADE.



LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808 CLIENT PROJECT NAME: LONG BEACH CITY COLLEGE

CLIENT PROJECT NUMBER:

3045-002-00 ARCHITECT:

BUILDING " O "

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc.

1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

STRUCTURAL Englekirk & Sabol (323) 733-2640

(310) 241-6550

MECHANICAL / ELECTRICAL / PLUMBING M-E Engineers (310) 842-8700

GNATURE BLOCK

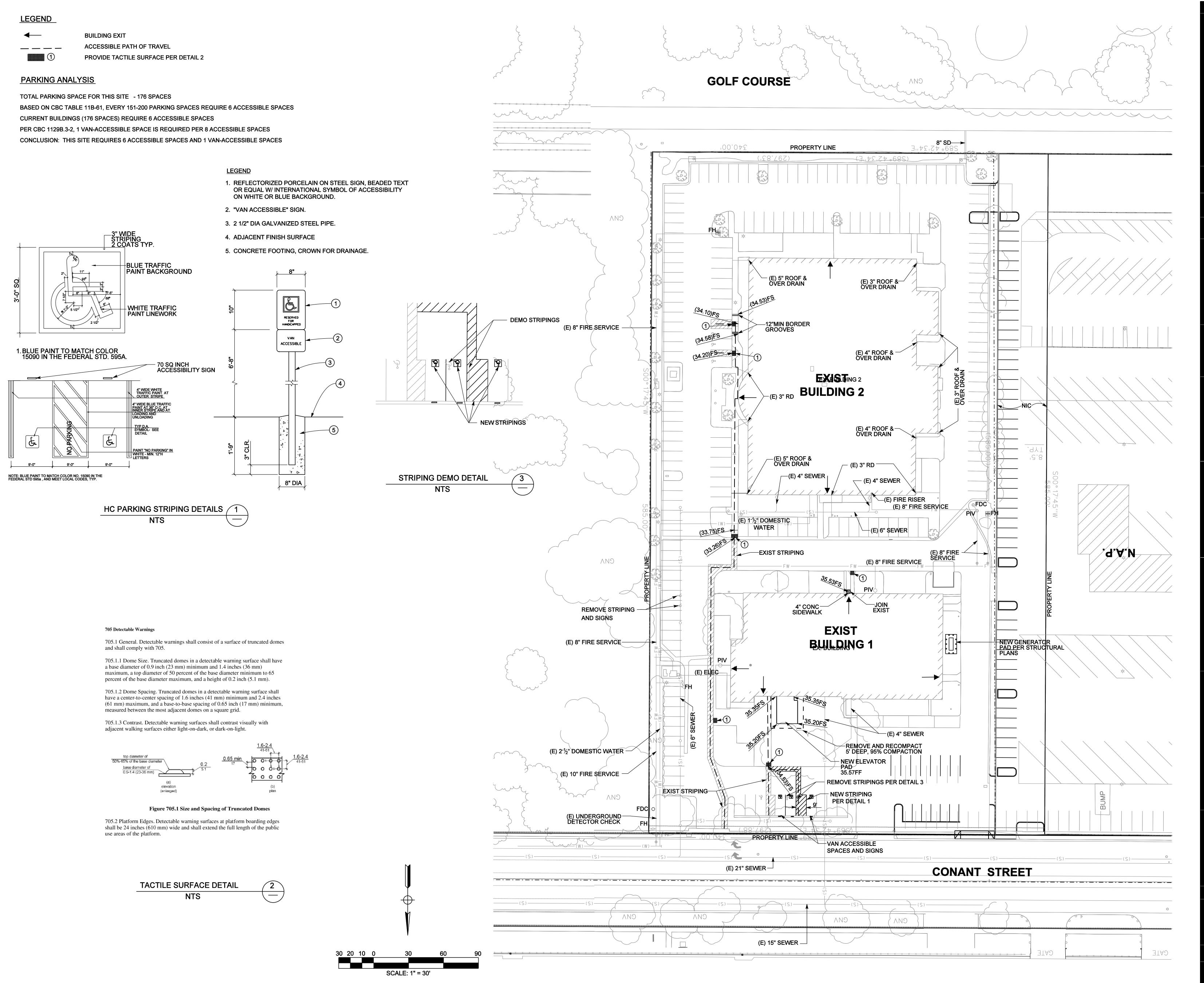
08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

KEY PLAN LOS CERRITOS CHANNEL

FIRE ACCESS PLAN

AUGUST 8, 2011 RECORD DRAWING



4900 CONANT STREET, LONG BEACH,
CALIFORNIA 90808

CLIENT PROJECT NAME:
LONG BEACH CITY COLLEGE

CLIENT PROJECT NUMBER: **3045-002-00**

BUILDING " O "

HR

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

STRUCTURAL
Englekirk & Sabol
(323) 733-2640

MECHANICAL / ELECTRICAL / PLUMBING
M-E Engineers
(310) 842-8700

<u>DATA / TELECOM</u> Vantage Technology Consulting Group (626) 793-7847

SECURITY Schirmer Engineering (310) 782-0850

NATURE BLOCK

08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

KEY PLAN

LOS CERRITOS CHANNEL

WANT STREET

LOS CERRITOS CHANNEL

CONANT STREET

GRADING AND DRAINAGE PLAN

COMM. NO. 3045-002-00

| SCALE 1"=30" |
| DATE AUGUST 8, 2011 |
| DRAWN FS |
| RECORD DRAWING

C-2

METAL DECKING

- Provide metal decking by manufacturer(s) indicated on drawings.
- 2. Floor_decking:
- A. Provide metal floor decking and closure angles complying with ASTM A653 SS Grade 33, with a minimum yield of 38,000 psi and galvanized with G60
- commercial coating complying with ASTM A525.

 B. Form floor decking with integral locking lugs or embossments to provide a mechanical lock between concrete and decking.
- Shear studs:1.Provide shear studs complying with ASTM A108,Grade 1015 or 1020.
- 2.Provide 3/4" diameter shear studs on all floor beams and girders. Position studs in a single row over center of member web unless noted otherwise.
 3.Space shear studs @ 12" o/c maximum unless noted
- otherwise on plan as follows:

 4.Weld shear studs in compliance with AWS D1.1.

 Welders shall be certified as required by the Governing Code Authority. Fasten with an automatic end weld gun.
- 5.Do not lap 18 gauge decking or thicker where 3/4" diameter shear studs are to be attached to supports.
- Ploor decking is designed for unshored construction to maximum spans indicated. If conditions occur where spans exceed maximum, provide adequate shoring or heavier gauge decking; the latter subject to review by Architect (Structural Engineer).
- E. Provide perforations or slots in floor decking, 1.5% maximum open area, for ventilation of structural concrete at areas exposed to weather or areas where waterproofing is used.
- A. Provide metal roof decking and closure angles complying with ASTM A653 SS Grade 33, with a minimum yield of 38,000 psi and galvanized with G60
- commercial coating complying with ASTM A525.

 B. Provide perforations or slots in roof decking, 1.5% maximum open area, for ventilation of insulating or structural concrete.
- C. Insulating concrete:
 1.Provide insulating concrete (vermiculite) as
- ER-3260.

 2.Provide insulating, lightweight aggregate complying with ASTM C332, Group I. Provide Portland cement complying with ASTM C150.

manufactured by Siplast/Icopal as approved by ICC

- Portland cement complying with ASTM C150.

 3.Provide reinforcing mesh using 2" hex woven, 19 gauge, galvanized wire with additional 16 gauge galvanized wire spaced 3-1/2" apart.
- D. Roof decking is designed for unshored construction.
- E. Do not suspend piping, ducts, work utilities or other loads with exception of suspended acoustical ceilings with integrally supported light fixtures from roof decking. Submit methods of support from roof framing for loads other than acoustical ceilings to Architect (Structural Engineer).
- 4. Provide closure angles at openings for mechanical equipment, ducts, piping, vents, conduits, etc., including those not shown on structural drawings. Closure angles shall be 18 gauge and be welded to decking, unless detailed otherwise.
- Bear decking at least 2 inches at supports. Lap decking at ends at least 2 inches and center laps over supports.
- 6. Weld metal decking in compliance with ANSI/AWS D1.3 and CBC Chapter 22, Division VI using a minimum of E60XX electrodes. Welders shall be certified as required by the Governing Code Authority.
- 7. Screed concrete parallel to metal decking to thickness indicated on drawings.
- 8. Submit complete metal decking shop drawings to Architect (Structural Engineer) for review.
- 9. Pipes, sleeves, electrical conduit, etc. shall not be embedded in metal deck concrete unless approved by the Architect (Structural Engineer). Embedded items shall not reduce the assembly fire rating unless supplemental fireproofing is provided as required.

STRUCTURAL STEEL (Continued)

- B. Project Welding Requirements1. The project welding requirements shall apply to
- all shop and field welds.

 2. A meeting shall be held with the Architect
 (Engineer), the Inspector, and the contractor's
 personnel supervising the shop and field welding
 activities prior to any fabrication to review
 connection details, welding procedures, and
- inspection requirements.

 3. The Inspector shall verify compliance with the approved project welding requirements. Any deviation or lack of compliance with the approved requirements shall be reported immediately to the Architect (Engineer) and Contractor.
- 4. Project welding requirements shall be submitted to the Architect (Engineer) for review prior to the commencement of any welding.
 5. In addition to requirements described elsewhere in the contract documents, the approved project
- welding requirements shall, at a minimum, consist of the following, (refer to AWS D1.1 Annex H):

 a. Welding Procedure Specification (WPS) for each weld and position as required by AWS D1.1 (Section 3.6 and Section 4, Part B) and signed by a registered professional engineer in California retained by the Contractor.
- b. Supplemental welding procedure.
 c. Shop drawings that reference the appropriate WPS for each weld required for each connection and required supplemental welding procedure.
 d. Welder performance qualifications approved by
- the Deputy Inspector.
 e. Qualification by testing of any welding procedure that is not pre-qualified per AWS D1.1 (Section 3.1 and 3.2.1)
- C. Inspections1. Inspection: The following requirements shall apply to welding inspections performed for the
 - project.

 a. The lead welding inspector shall be a
 Certified Welding Inspector (CWI) per AWS-QC1
 Standards, shall be approved by the
 Structural Observer and certified by the
 Building Official as a registered deputy
 inspector for structural steel welding (ICBO
 Certification) and shall possess a minimum
 level of UT Level II Certification. Other
 welding inspectors performing visual
 inspection under the supervision of the lead
 welding inspector shall possess ICBO
 Certification, and persons performing
 nondestructive testing shall possess UT Level
 II Certification. Not more than four non-CWI
 - All welding shall be inspected visually as required by AWS D1.1 Section 6.9 and Table 6.1.

inspectors shall be under the supervision of

acceptable substitute for ICBO Certification

a CWI. Certification by ICC—ES is not an

METAL STUDS

- No attempt has been made to show or indicate non-load bearing metal studs on structural drawings. For information on non-load bearing metal studs see architectural drawings and Specifications. Notes below apply to metal studs shown on structural drawings only.
- 2. Provide metal studs and track formed from standard commercial steel with a minimum yield point at 33,000 psi and complying with ASTM A568, CBC Chapter 22, Division VI and "Specifications for the Design of Cold—Formed Steel Structural Members" of AISI, 2001 edition. Provide studs and track with minimum yield point at 50,000 psi for 16 gauge and heavier.
- 3. Weld studs complying with ANSI/AWS D1.3 and CBC Chapter 22, Division VI. Welders shall be certified as required by Governing Code Authority
- by Governing Code Authority.
 4. Provide studs as manufactured by members of Steel Stud Manufacturing Association (SSMA) complying with ICBO Evaluation Report no. 4943P and Los Angeles City Research Report RR25529. Provide studs of the following section properties:
- 5. Provide unpunched 16 gauge track, unless noted otherwise, of dimensions to ensure proper fit of studs.
- Cut framing components, such as bracing, squarely or at an angle to fit tight against abutting members. Hold members firmly in position until properly fastened.
- 7. Attach studs using plug, butt or seam welds, unless noted otherwise. Where studs are burned through by welding, provide suitable stitch plate of same gauge. Splices in axial loaded studs or braces are not permitted. Provide butt welds or splices at joints in track. Wire tying of framing components is not permitted.
- 8. Prefabricated panels shall be squared and braced to avoid racking. Lift prefabricated panels in a manner so as not to cause local distortion of any member.
- 9. Submit shop drawings to Architect (Structural Engineer)

GENERAL NOTES

CAST-IN-PLACE CONCRETE

Slabs on metal deck

- 1. All concrete work to conform to CBC Chapter 19.
- 2. Provide normal weight aggregates of natural sand and rock complying with ASTM C33 (aggregate size).
- 3. Provide Portland Cement conforming to ASTM C150, Type II.

3000 psi

- 4. Provide normal weight concrete (145 pcf), with proven shrinkage characteristics of less than 0.05%, attaining minimum compressive strengths at 28 days (f'c) as follows, unless noted otherwise:

 Retaining walls
 Spread footings
 Slabs on grade

 3000 psi
 3000 psi
- 5. Provide lightweight concrete (112 pcf), where specifically indicated, attaining a minimum compressive strength of 3000 psi at 28 days. Provide lightweight aggregate of the expanded shale type complying with ASTM C330.
- 6. Submit concrete design mix data for each type and compressive strength of concrete required signed by and bearing the seal of a registered civil engineer in state to Architect (Structural Engineer). Base design mix on field experience or trial mixtures, or both, as stipulated in CBC 1905.3 and ACI 318-05 Section 5.3.
- 7. Submit shop drawings to Architect (Structural Engineer) indicating locations of concrete construction joints for review prior to placing concrete. Locate joints at locations to minimize effects of shrinkage as well as being placed at points of low stress and should conform to ACI 318, Section 6.4.
- 8. Slump not to exceed 4 (+-1) inch. For slab on grade, walls, slab on metal deck and suspended slabs, slump not to exceed 4 inches (+0", -1").
- 9. Do not use concrete or grout containing chlorides.
- 10. Do not embed conduits, pipes, or sleeves in structural concrete, including slabs on metal deck, except where specifically detailed or accepted by Architect (Structural Engineer). Locate electrical conduit 3" apart minimum and within middle third of member.
- 11. Form exposed corners of walls, etc., with 3/4 inch chamfers unless detailed otherwise.
- 12. Roughen existing concrete surface to a full amplitude of 1/16 inch where existing concrete abuts new concrete.
- 13. Perform concrete work in compliance with ACI 301.
- 14. Maintain concrete above 50 degrees Fahrenheit and in a moist condition for a minimum of 7 days after placement unless otherwise accepted by Architect (Structural Engineer).
- 15. All topping slabs to receive 6 x 6 W2.9 x W2.9 welded wire fabric unless noted otherwise. Place fabric in center of slab or a maximum of 2" clear from the top of concrete, whichever is less.
- 16. Slab on grade is not designed as a structural diaphragm.

STRUCTURAL STEEL

- 1. STRUCTURAL STEEL: Material, Fabrication, and Erection
 A. Materials
 - 1. Provide structural steel complying with the following ASTM Standard Specifications, unless noted otherwise:

 All structural steel unless noted below

 ASTM A572 Grade 50 or ASTM A992

 Structural steel noted thus (65) or (50)
 - ASTM A913(65 ksi) or ASTM A572 GR 50(50 ksi)
 Plates, channels, angles
 ASTM A36
 Pipes
 - ASTM A53, Grade B(35 ksi) Hollow structural section ASTM A500, Grade B(46 ksi — Rectangular Section, 42 ksi — Round Section).
 - Anchor rods
 ASTM F1554, Grade 55
 ASTM F1554, Grade 105 at SFRS
 - Threaded round stock
 ASTM A36
 Reinforcing steel
 - See Reinforcing Steel Section.
 Furnish readily identifiable structural steel in compliance with CBC 2203.
- B. High Strength Bolts

 Provide high strength bolts, nuts and washers complying with ASTM A325 unless noted otherwise. All high strength bolts shall be bearing type with threads included in shear plane (A325-N), unless noted otherwise. Provide slip-critical high strength bolts (A325-SC) for all Seismic Moment Frame beam-to-column connections unless
- otherwise noted.

 2. Assemble high strength bolts in compliance with Specification for Structural Joints Using ASTM A325 or A490 Bolts (2004).

 3. Tighten A325-N bolts to a snug tight condition
- 3. Tighten A325—N bolts to a snug tight condition. Tighten A325—SC bolts to at least the minimum tension specified in the referenced standard using one of the following tightening methods: turn—of—nut, calibrated wrench or direct tension indicator tightening.
- C. Fabricate and erect structural steel in compliance with 2005 Specification for Structural Steel Buildings and CBC Chapter 22.
- D. Apply sprayed fireproofing over structural steel with Monokote MK6/CBF or MK6/ED as manufactured by W.R. Grace and Company as approved by ICC—ES ESR—1186. Hourly fire resistive requirements shall be determined using CBC Table 6—A and building types of construction as indicated on architectural drawings.
- E. Submit shop drawings to Architect (Structural Engineer) for review and, upon request, to Building Official.

Welding A. Basic Requirements

- 1. Weld structural steel in compliance with ANSI/AWS D1.1 and AISC Specification, Chapter J. Welders shall be certified as required in the plans and by Governing Code Authority. Welding shall be done by electric arc process using low-hydrogen electrodes whose specified tensile strength is not less than 70 ksi unless noted otherwise, and 80 ksi for all ASTM 913 steel. Welding may be performed using submerged arc process with automatic welding (SAW-1). Perform shop welding of full penetration groove welds by technicians and fabricators approved by the Building Official.
- Unless a larger size fillet weld is indicated, provide minimum size of weld per AISC Specification, Section J2 and Table J2.4.
- 3. No attempt has been made to differentiate between shop and field welded connections.

GENERAL (Continued)

- 16. The CAD drawing files are the property of the Structural Engineer and will not be released to the Contractor or subcontractor for their use.
- 17. Submit deferred submittal items to the Architect (Structural Engineer) for review. After review, submit deferred submittal items to the Governing Code Authority for approval prior to installation. The following is a list of deferred approval items:
- Cold formed metal stud system, exterior and interior
 Exterior curtainwall systems
- 18. All abbreviations of referenced standards are per CBC Chapter 35.

FOUNDATIONS

- 1. Existing foundation design is not available.
- New foundation is based on the recommendations in the duedilingence level Geotechnical investigation prepared by Leighton Consulting, Inc. Report no. 600303-002, dated October 3, 2008.
- 2. Foundation design is based on a bearing capacity of 1,500 psf with a 33% increase for seismic or wind loading.
- 3. Design lateral bearing pressure is 250 psf/ft with a 33% increase for seismic or wind loading and a 200% increase for isolated pole type footings.
- 4. Design coefficient of friction is 0.33 with a 33% increase for seismic or wind loading.
- 5. Found footings a minimum of 18" below adjacent grade or finish floor, whichever is lower.
- 6. Found footings and building slab—on—grade on compacted fill per CBC 1803.5 or undisturbed natural grade as listed in CBC Table 1804.2.
- 7. Foundation excavations are to be observed by and acceptable to a Building Official or his representative prior to placement of fill, reinforcing steel, or
- 8. Perform filling, backfilling, compaction, etc., complying with CBC 1803.2 and 1803.5.
- Do not place backfill behind retaining walls prior to completion and inspection of waterproofing. Adequately shore retaining walls during backfill operation.
- 10. A moisture barrier membrane shall be placed per recommendations by the Architect.

REINFORCING STEEL

- 1. Provide reinforcing steel complying with ASTM A615, Grade
- 2. Provide smooth welded wire fabric complying with ASTM A185. Lap fabric 1-1/2 spaces (12" minimum). Provide deformed wire stirrups, size D4 and larger only, complying with ASTM A497.
- 3. Splice reinforcing steel where indicated.
- 4. Lap reinforcing steel at splices to the following

Lap re	inforcing	steel at splice	s to th	e followi	ng minimur
length	s, unless	noted otherwise	(appli	cable to	3,000 psi
normal	weight co	oncrete only):			
bar	top	other	bar	top	other
size	bars	bars	size	bars	bars
#3	2'-4"	1'-10"	#8	7'-9"	6'-0"
#4	3'-1"	2'-5"	#9	8'-9"	6'-9"
#5	3'-11"	3' - 0"	#10	9'-10"	7'-7"
#6	4'-8"	3'-7"	#11	10'-11"	8' - 5"
#7	6'-9"	5'-3"	"		
"—	,, ,		• • •		

- "Top bars" are horizontal bars with more than 12 inches of concrete cast below bars. "Other bars" are horizontal bars with less than 12 inches of concrete cast below bars and all vertical bars. Splice lengths indicated above only apply when clear distances between reinforcing steel, including spliced reinforcing steel, are 2 bar diameters or greater. Increase splice lengths by 43% if clear distances are less than 2 bar diameters, but never less than minimum clear distances indicated below.
- 5. Minimum clear distances between reinforcing steel, including spliced reinforcing steel, shall be 1" or 1 bar diameter, whichever is greater. Minimum clear distance at columns shall be 1-1/2" or 1-1/2 bar diameters, whichever is greater. For bundled bars, minimum clear distances between units of bundled bars shall be same as single bars except bar diameter is derived from equivalent total area of bundle.
- 6. Minimum concrete coverage: maintain the following minimum clear distances between reinforcing steel and face of concrete unless noted otherwise:

 slabs on grade (center of slab)

 concrete below grade, formed

 concrete below grade, unformed

 structural slabs (top and bottom)

 2"
- 7. Chairs or spacers for reinforcing shall be plastic or plastic coated when resting on exposed surfaces.
- plastic coated when resting on exposed surfaces.

 8. Provide dowels for walls and columns matching vertical

reinforcing size and spacing, unless noted otherwise.

- 9. Weld reinforcing steel complying with AWS D1.4, except as modified by UBC Standard 19-1. Do not weld reinforcing steel other than those conforming to ASTM A706. If welding of reinforcing steel other than A706 is desired, submit proposed procedure, indicating conformance to code and requirements of Governing Code Authority, to Architect (Structural Engineer) for acceptance and to Governing Code Authority for approval prior to execution. Welders shall be certified as required by Governing Code
- 10. Bend reinforcing steel cold unless otherwise accepted by Architect (Structural Engineer). Provide special inspection of all cold bent reinforcing.
- 11. Securely tie anchor bolts, reinforcing steel, inserts, etc., in place prior to pouring concrete or grout.
- 12. Submit reinforcing steel shop drawings indicating reinforcing placement, including splice locations and lengths, to Architect (Structural Engineer) for review and acceptance. Promptly notify Architect (Structural Engineer) prior to developing reinforcing steel shop drawings if insufficient clear distances between reinforcing steel or other congestion is encountered. Prepare shop drawings in compliance with ACI 315, Part B.

GENERAL

- Perform construction and workmanship in compliance with contract documents and 2007 California Building Code (CBC). Building Occupancy category per CBC Table 1604.5
- 2. Governing Code Authority: Long Beach Community College
- 3. Design Criteria:

Elevator Lobby Floor Live Loads: 100psf (Non Reducible)

Roof live loads = 20psf (Reducible)

Basic wind speed = 85 mph
Wind importance factor = 1.0
Wind exposure
North—South direction = C
East—West direction = C
Internal pressure coefficient = +/-0.18
Components and cladding

Design wind pressure = 15 psf inwards and 32 psf

Earthquake design data
Seismic importance factor = 1.0
Mapped spectral acceleration

Wind design data:

outwards

Ss = 0.75g S1 = 0.3g Site Class = C Spectral response coefficients

S_DS = 0.825g S_D1 = 0.45g Seismic design category = D Superstructure

Basic seismic-force resisting system = Tilt-up concrete walls

Substructure: Elevator Tower

Basic seismic-force resisting system =

Concentric braced frame

Design base shear = 40 kips
Seismic response coefficient, Cs = 0.07g
Response modification factor, R = 3.25
Analysis Procedure used = Simplified
alternative structural design criteria for
simple building frame system

- 4. Structural drawings, as part of contract documents, indicate information sufficient to convey design intent. If errors, inconsistencies or omissions are discovered, promptly notify Architect (Structural Engineer) before proceeding with work.
- 5. Partial existing structural drawings for the Flight Simulator Training Facility Building to the Long Beach Plant project, prepared by The Elliott Group, dated July 1, 1983, including all addenda and revisions, and structural investigation reports for both phase I and II, dated September O1 and September 22, 2009, are used as a reference to prepare these contract documents.
- 6. No portion of structural related work, including shop drawing development, shall be performed without considering requirements of contract documents in their entirety. For example, refer to architectural, mechanical, plumbing and electrical drawings for size and location of openings, penetrations and embedments for ducts, piping, vents, conduits and other items to be incorporated in structural work.
- 7. Details and schedules indicated as "typical" may not be specifically referenced on drawings. Determine where each typical detail or schedule applies before proceeding with work. If conditions are found which are not specifically detailed and no typical detail or schedule applies, promptly notify Architect (Structural Engineer).
- 8. Conditions shown or noted as existing are based on best information currently available when drawings were prepared. No warranty is implied as to accuracy of these existing conditions.
- Take field measurements and verify field conditions and compare such measurements and conditions with contract documents. If errors, inconsistencies or omissions are discovered, promptly notify Architect (Structural Engineer) before proceeding with work.
 Contract documents represent the finished structure.
- O. Contract documents represent the finished structure. Unless otherwise shown, they do not indicate method of construction. Provide construction means, methods, techniques, sequences and procedures as required. Provide adequate excavation procedures, shoring, bracing and erection procedures complying with national, state and local safety ordinances.
- 11. Observation visits to site by field representatives of Architect (Structural Engineer) do not include inspections of construction means and methods. Observations performed by Architect (Structural Engineer) during construction are not continuous and detailed inspection services which are performed by others. Observations performed by Architect (Structural Engineer) are performed solely for the purpose of determining if Contractor understands design intent conveyed in contract documents. Observations do not guarantee Contractor's performance and are not to be construed as supervision of construction.
- 12. Modifications or substitutions: design, materials, equipment and products other than those indicated or specified may be considered for use provided a written request, subject to review, is submitted to owner, Architect (Structural Engineer) and Governing Code Authority prior to its use or inclusion on any shop drawing.
- 13. Shop drawing submittals:

 A. Review and stamp shop drawings prior to submission to
- Architect (Structural Engineer). Review for completeness and compliance with contract documents.

 B. Submit shop drawings to Architect (Structural Engineer) as indicated or specified for review and acceptance prior to fabrication. Review will be for
- contract documents.

 C. When an engineer is required to sign and stamp shop drawings and calculations, ensure seal indicates engineer as registered in state where project site

general conformance with design intent conveyed in

- D. Shop drawings are not a part of contract documents.
 Therefore, Architect's (Structural Engineer's) review does not constitute an authorization to deviate from terms and conditions of the contract.

 E. Shop drawings will be rejected for incompleteness,
- lack of coordination with other portions of contract documents, lack of calculations (if required), or where modifications or substitutions are indicated without prior review per paragraph above.

 F. Submit shop drawings and calculations to Governing
- Code Authority when specifically indicated or requested.

 G. Maintain a copy of all shop drawings accepted by Architect (Structural Engineer) at site during

construction period.

bracing.

H. Structural Engineer requires 10 working days after receipt of shop drawings and calculations for processing.
I. Only three copies of each structural shop drawina

submittal will be accepted for review and marked with

comments, if any. All other additional copies submitted will be returned unmarked.

14. Install and anchor mechanical and electrical and plumbing equipment to structure complying with ASCE/SEI 7-05, Chapter 13, as modified by CBC 1614.1.11 through 1614.1.16. Isolators, fasteners and any other element providing stability for equipment shall be approved by

ICBO or equivalent testing procedure and be capable of transmitting code required lateral loads. Provide

suspended equipment with approved lateral or sway

15. Brace piping and ducts complying with latest edition of "Guidelines for Seismic Restraints of Mechanical Systems" by the Sheet Metal and Air Conditioning Contractors National Association.

B

LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH,
CALIFORNIA 90808
CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE BUILDING " O " RECORD DRAWING

CLIENT PROJECT NUMBER: 3045-002-00

RCHITECT:

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608

Los Angeles, California USA 90067
Telephone 310.557.7600 Facsimile 310.553.1668

CONSULTANTS:

STRUCTURAL Job Number 09–G107
Englekirk & Sabol (323) 733-2640

CIVIL JMC2 (626) 793-7847

MECHANICAL / ELECTRICAL / PLUMBING M-E Engineers (310) 842-8700

DATA / TELECOM Vantage Technology Consulting Group (626) 793-7847

(310) 782-0850

SIGNATURE BLOCK

Schirmer Engineering



LOS CERRITOS CHANNEL

BUILDING 2

REVISION HISTORY - THIS SHEET

WORTH NORTH AND THE PROPERTY OF THE PROPERTY O

BUILDING

GENERAL

COMM. NO. 3045-002-00
SCALE NONE
DATE August 8, 2011
DRAWN STAFE

RECORD DRAWING

© COPYRIGHT HAMMEL GREEN AND ABRAHAMSON, INC.

W:\Projects\09G107\S001.dwg, 8/2/2011 3:00:01 PM, Bluebeam PDF8 Printer Hig

CONTIN- PERIODIC INSPECTION uous STANDARD Inspect reinforcing steel, including ACI 318: 3.5, 7.1-7.7 prestressing tendons, and placement. AWS D1.4 2. Inspect reinforcing steel welding in accordance with detail ___ ACI 318: 3.5.2 Inspect bolts to be installed in concrete prior to and during placement of concrete where ____ allowable loads have been increased. ACI 318: Ch.4, 5.2-5.4 4. Verifying use of required design mix. √ At the time fresh concrete is sampled to ASTM C 172 fabricate specimens for strength tests, ASTM C 31 perform slump and air content tests, and ACI 318: 5.6, 5.8 determine the temperature of the concrete. Inspection of concrete and shotcrete ACI 318: 5.9, 5.10 placement for proper application techniques. Inspection for maintenance of specified ACI 318: 5.11-5.13 curing temperature and techniques.

REQUIRED INSPECTION OF REINFORCED CONCRETE*

FREQUENCY

√

*Applies to concrete with specified concrete strength greater than 2500 psi.

Inspection of prestressed concrete:

a. Application of prestressing forces.

Erection of precast concrete members.

prior to stressing of tendons in post-

c. Other reinforcing steel

Verification of in-situ concrete strength,

tensioned concrete and prior to removal of

shores and forms from beams and structural

b. Grouting of bonded prestressing tendons

in the seismic-force-resisting system.

REQUIRED INSPECTION OF STRUCTURAL STEEL INSPECTION FREQUENCY CONTIN- PERIODIC STANDARD UOUS Structural Steel Verify conformance with ASTM standards ASTM A6 or ASTM A568 b. Provide certified mill test reports c. Inspect steel frame joint per drawings √ See drawings High-strength Bolts, Nuts and Washers See drawings, ASTM Verify conformance with ASTM standards standards, ÄNSI/AISC 360 b. Provide manufacturer's certificate of compliance ANSI/AISC 360 Section c. Inspect bearing-type connections ANSI/AISC 360 Sections d. Inspect slip-critical connections M2.5 and M5.4 Weld Filler Metal a. Verify conformance with ASTM standards ANSI/AISC 360 Section shown b. Provide manufacturer's certificate of compliance Welding (Structural Steel) a. Inspect complete and partial penetration groove welds b. Inspect multi-pass fillet welds AWS D1.1 c. Inspect single-pass filler welds > 5/16 d. Inspect single-pass filler welds ≤ 5/16° e. Inspect floor and deck welds ANSI/AISC 360 Section f. Shear connectors Welding (Reinforcing Steel) a. Verify weldability of steel other than A706 b. Inspect steel in boundary elements of AWS D1.4. ACI 318 special shear walls, steel that resists flexural and axial forces in intermediate Section 3.5.2 and special moment frames and shear reinforcement

GENERAL NOTES

_ QUALITY ASSURANCE

ACI 318: 18.20

ACI 318: 18.18.4

ACI 318; Ch. 16

ACI 318: 6.2

- 1. Testing laboratory shall submit reports indicating results and observations of tests and inspections and stating compliance or noncompliance with contract documents to Architect (Structural Engineer) and to Governing Code Authority. Contractor shall reimburse Owner for costs related to tests and inspections of unidentifiable materials or materials furnished without certified laboratory test reports, materials found deficient after initial tests and inspections, or materials replacing deficient materials. See Specifications for additional test and inspection requirements.
- 2. Provide cement, aggregates, reinforcing steel, structural steel, high—strength bolts, etc., from identifiable tested stock. Submit certified laboratory test reports to Architect (Structural Engineer) and to Governing Code Authority. If materials cannot be identified or if certified laboratory test reports cannot be made available, testing laboratory will perform tests to determine conformance with contract documents as directed by Architect (Structural Engineer).
- Testing laboratory shall provide special inspection, complying with CBC Section 1701 (unless otherwise noted), for the following:
 A. Concrete and reinforcing steel where specified
 - concrete compressive strength is greater than 2500 psi.

 Bolts installed in concrete.
 - Bolts installed in concrete.
 Field welding including shear studs.
 High—strength bolts.
 Insulating concrete.
- 4. Testing laboratory shall review concrete mix design data and shall perform the following concrete tests at frequency indicated in Required Inspections of Reinforced Concrete in Quality Assurance Section.
- 5. Testing laboratory shall perform the following tests in structural steel as indicated in Required Inspections of Structural Steel in Quality Assurance Section.

STRUCTURAL OBSERVATION

- 1. Structural observation is required for the structural system in accordance with CBC Section 1709. Structural observation is the visual observation of the elements and connections of the structural system at significant construction stages and the completed structure for general conformance to the approved plans and specifications. Structural observation does not waive the responsibility for the inspections required of the Building Inspector or the Special Inspector.
- 2. The Owner shall employ a registered design professional to perform the structural observation. The Engineer or Architect shall be registered or licensed in the State of California. The Department of Building and Safety recommends the use of the Engineer or Architect responsible for the structural design when they are independent of the Contractor.
- 3. The Owner or Owner's Representative shall coordinate and call for a meeting between the Engineer or Architect responsible for the structural design, Structural Observer, Contractor, affected Subcontractors and Deputy Inspectors. The purpose of the meeting shall be to identify the major structural elements and connections that affect the vertical and lateral load systems of the structure and to review scheduling of the required observations. A record of the meeting shall be included in the first Observation Report submitted to the Building Inspector.
- 4. The Structural Observer shall perform site visits at those steps in the progress of the work that allow for correction of deficiencies without substantial effort or uncovering of the work involved. At a minimum, the following significant construction stages require a site visit and an Observation Report from the Structural Observer:

CONSTRUCTION STAGES

A. Foundations

R Structural Stee

B. Structural SteelC. Floor and Roof

Floor and Roof Chord reinforcing and deck Metal Deck welding for first concrete pour.

OBSERVED[°]

at grid E and J.

ELEMENTS/CONNECTIONS TO BE

First foundation reinforcing steel placement at Elevator,

First anchor bolt placements

at CBF/SCBF base plate at

including bolting and

Elevator and at grid E and J. complete steel prection,

~~~~

- 5. The Structural Observer shall prepare a report for each significant stage of construction observed. The original of the Observation Report shall be sent to the Building Inspector's office and shall be signed and sealed (wet stamp) by the responsible Structural Observer. One copy of the Observation Report shall be attached to the approved plans. Copies of the report shall also be given to the Owner, Contractor, and Deputy Inspector.
- 6. A final Observation Report must be submitted to the building official, owner and Architect (Structural Engineer) which states that the site visits have been made and that all report deficiencies to the best of the structural observer's knowledge has been corrected and that the structural system generally conforms with the approved plans and specifications.
- 7. The Structural Observer shall send the original report to the following inspection office:

BCITY

# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH,
CALIFORNIA 90808

CLIENT PROJECT NAME:
LONG BEACH CITY COLLEGE
BUILDING " O "
RECORD DRAWING

CLIENT PROJECT NUMBER: 3045-002-00

RCHITECT:

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608

Los Angeles, California USA 90067
Telephone 310.557.7600 Facsimile 310.553.1668

CONSULTANTS:

STRUCTURAL Job Number 09-G107
Englekirk & Sabol (323) 733-2640

MECHANICAL / ELECTRICAL / PLUMBING
M-E Engineers (310) 842-8700

DATA / TELECOM
Vantage Technology Consulting Group (626) 793-7847

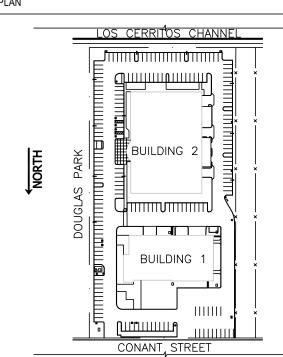
SECURITY
Schirmer Engineering (310) 782-0850

SIGNATURE BLOCK

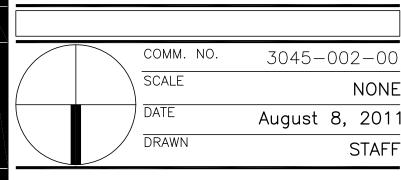


|                        | 08-28-09 |
|------------------------|----------|
| CONSTRUCTION DOCUMENTS | 09-30-09 |
| 100% CD                | 10-22-09 |
| 3 ADDENDUM #3          | 12-30-09 |
| RECORD DRAWING         | 08-08-11 |
|                        |          |
|                        |          |
|                        |          |
|                        |          |
| $\overline{\ \ }$      |          |

REVISION HISTORY - THIS SHEET

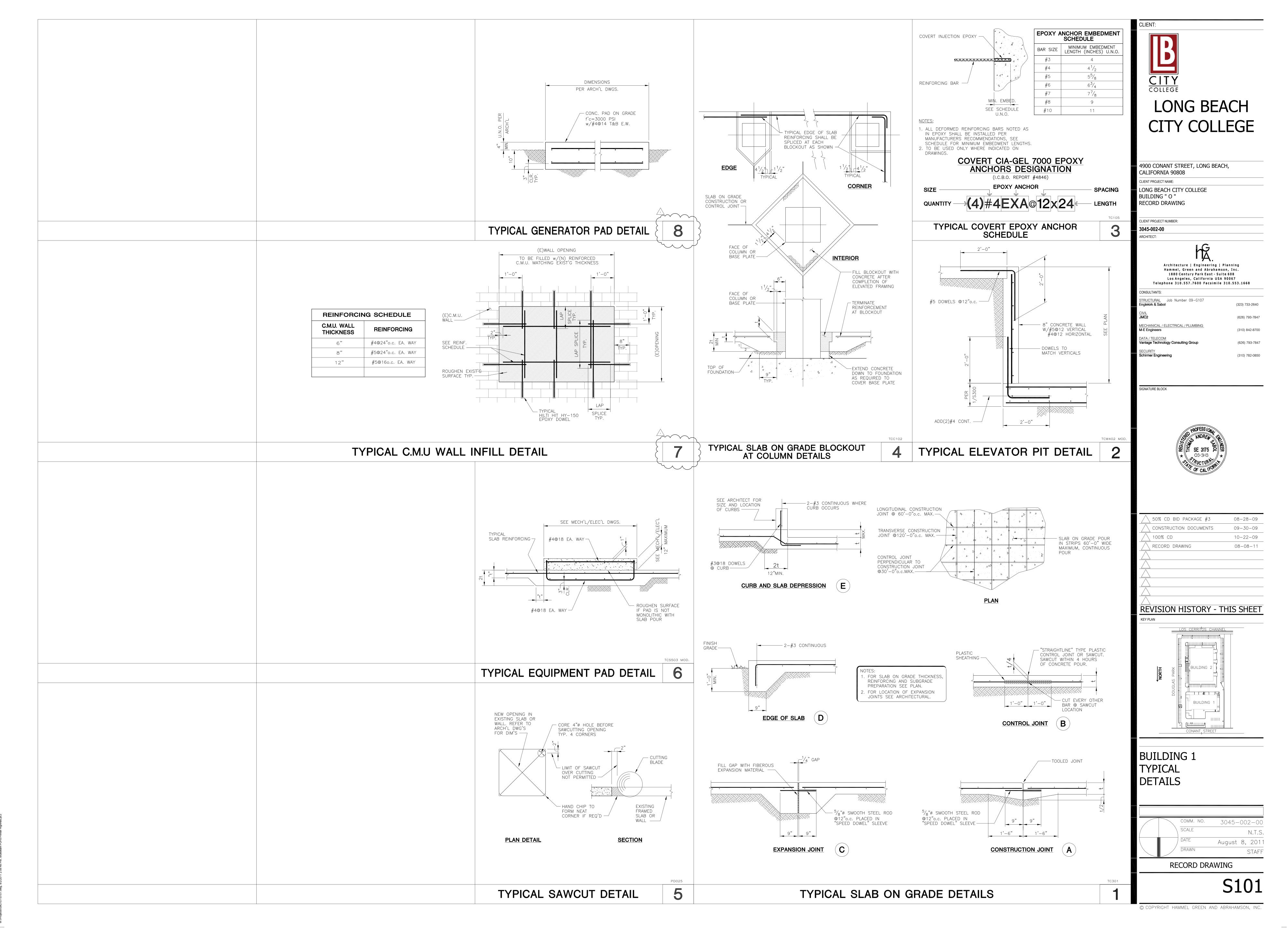


BUILDING 1 GENERAL NOTES

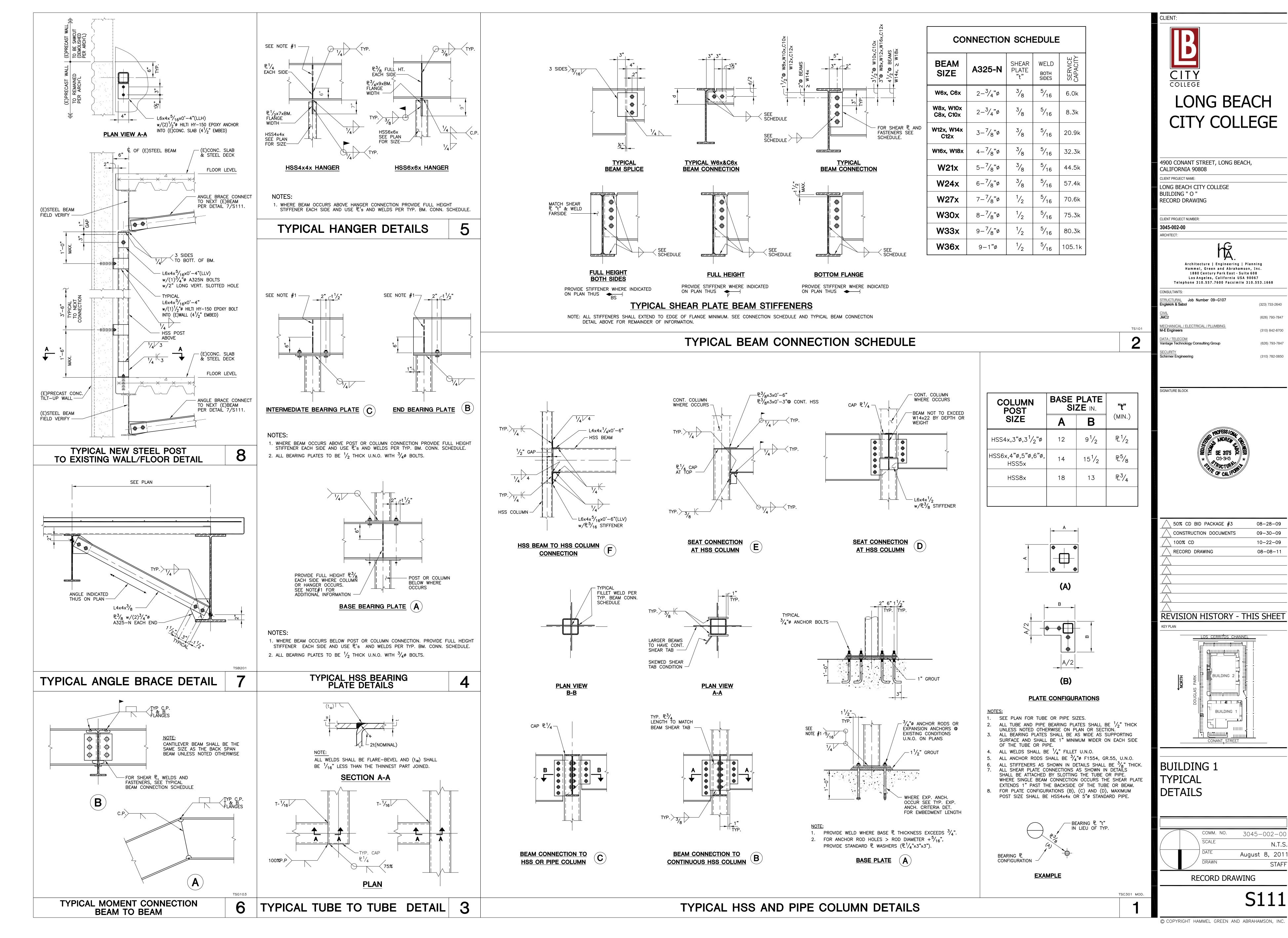


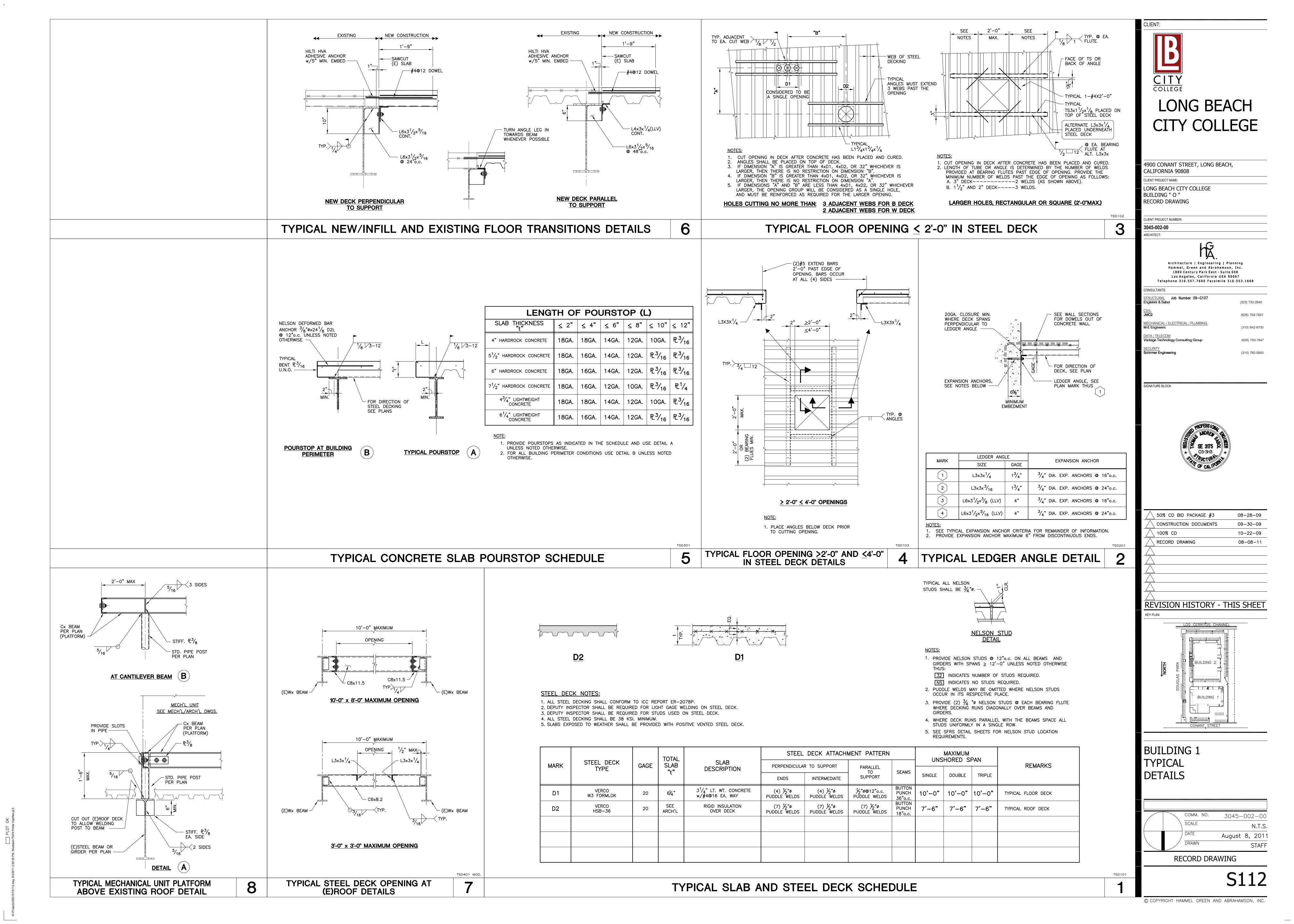
RECORD DRAWING

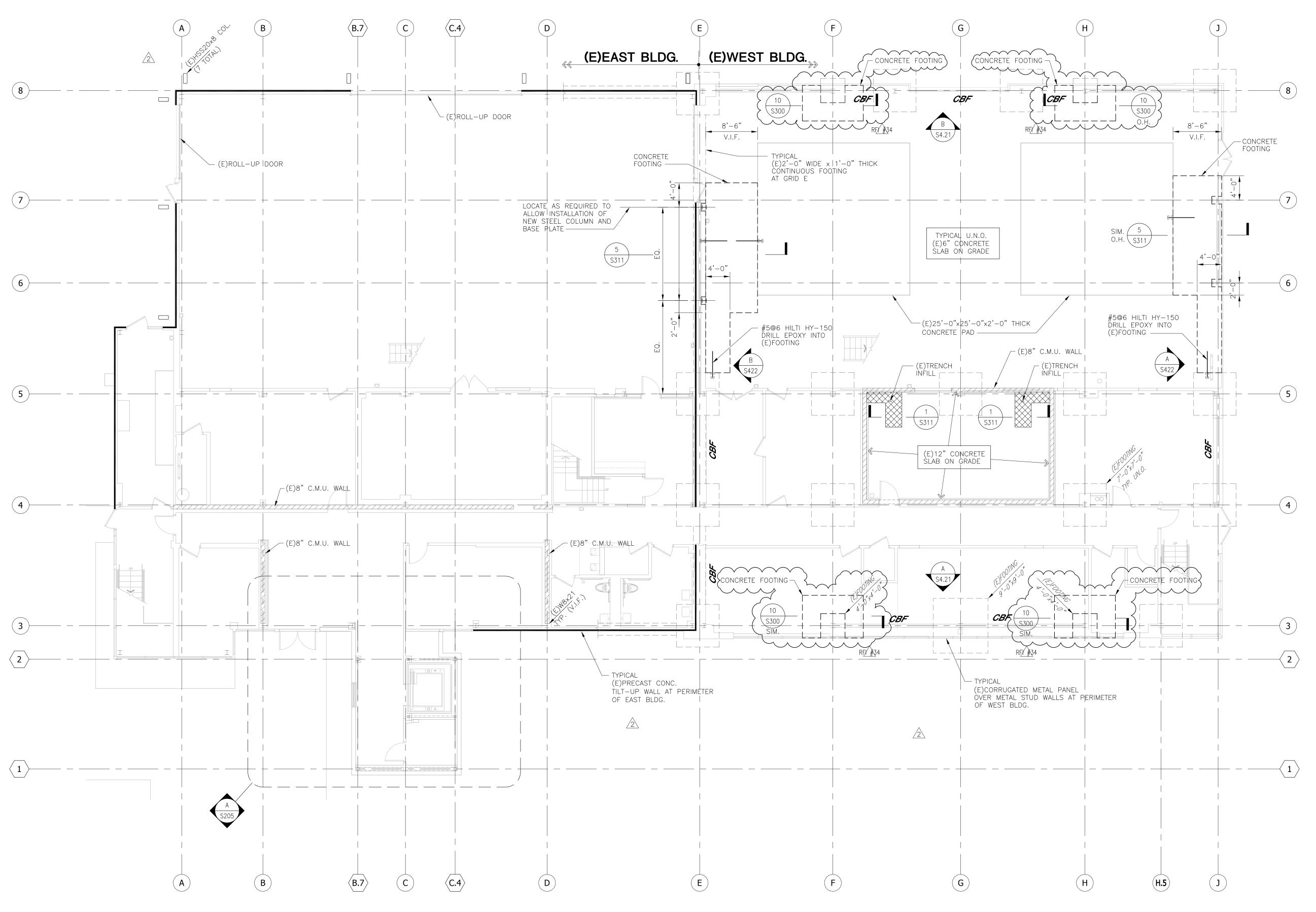
S002



MO TOJA —







# FOUNDATION/FIRST FLOOR PLAN



NOTES:

1. FOR GENERAL NOTES, SEE SHEET SO.01.

2. FOR TYPICAL DETAILS SEE S1 SERIES SHEETS. DETAILS AND SCHEDULES INDICATED AS 'TYPICAL' MAY NOT BE SPECIFICALLY REFERENCED ON DRAWINGS. DETERMINE WHERE EACH DETAIL OR SCHEDULE APPLIES BEFORE PROCEEDING WITH WORK.
 3. VERIFY ALL DIMENSIONS WITH AS—BUILT CONDITION AND ARCHITECTURAL DRAWINGS PRIOR

TO START OF WORK AND PREPARATION OF SHOP DRAWINGS.

4. SEE ARCHITECTURAL DRAWINGS FOR CONCRETE SLAB ELEVATIONS, DEPRESSIONS, SLOPES, OPENINGS, CURBS, DRAINS, TRENCHES, SLAB EDGE LOCATIONS, ETC., AND FOR WALL OVERALL DIMENSIONS, LOCATION OF OPENINGS, ETC., NOT INDICATED ON

WALL OVERALL DIMÉNSIONS, LOCATION OF OPENINGS, ETC., NOT INDICATED ON STRUCTURAL DRAWINGS.

5. EXISTING FINISHED SLAB ELEVATION IS +100'-00", UNLESS NOTED OTHERWISE,

PER ARCHITECTURAL DRAWINGS.

INDICATES EXISTING PRECAST CONCRETE THE THE THE TIME TO BE ARCHITECTURAL DRAWINGS.

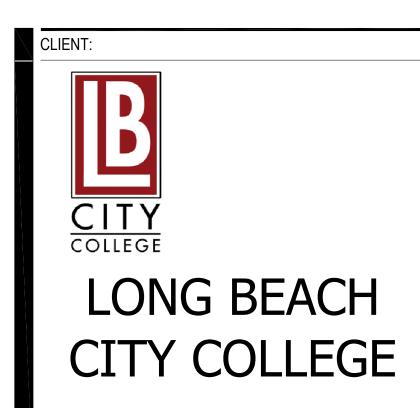
6. INDICATES EXISTING PRECAST CONCRETE TILT-UP WALL.

7. (E) OTH, O'

INDICATES EXISTING FOOTING SIZE (LENGTH x WIDTH), CONTRACTOR TO FIELD VERIFY ALL EXISTING FOOTING SIZE, DEPTH, TOP OF FOOTING, INCLUDING THICKNESS OF EXISTING SLAB ON GRADE.

8. **CBF** INDICATE EXISTING CONCENTRIC BRACE FRAME.

CONTRACTOR IS RESPONSIBLE TO DEMOLISH PORTIONS OF ANY (E)FOOTINGS AND OTHER MISC.
 CONCRETE OR STEEL, ELECTRICAL CONDUITS, OR MECHANICAL SYSTEMS THAT INTERFERE
 WITH THE NEW FOUNDATION AND STEEL FRAMING.



4900 CONANT STREET, LONG BEACH,
CALIFORNIA 90808

CLIENT PROJECT NAME:
LONG BEACH CITY COLLEGE
BUILDING " O "
RECORD DRAWING

CLIENT PROJECT NUMBER:

3045-002-00 ARCHITECT:

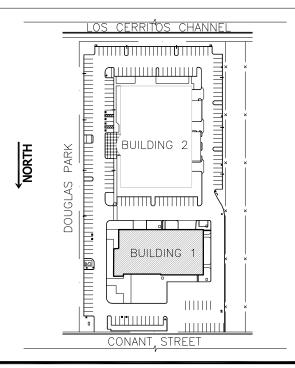


SIGNATURE B



|                        | 08-28-09   |
|------------------------|------------|
| CONSTRUCTION DOCUMENTS | 09-30-09   |
| 100% CD                | 10-22-09   |
| ADDENDUM #2            | 12-09-09   |
| RECORD DRAWING         | 08-08-11   |
|                        |            |
|                        |            |
|                        |            |
|                        |            |
|                        |            |
| REVISION HISTORY - T   | THIS SHEET |

REVISION HISTORY - THIS SHEET

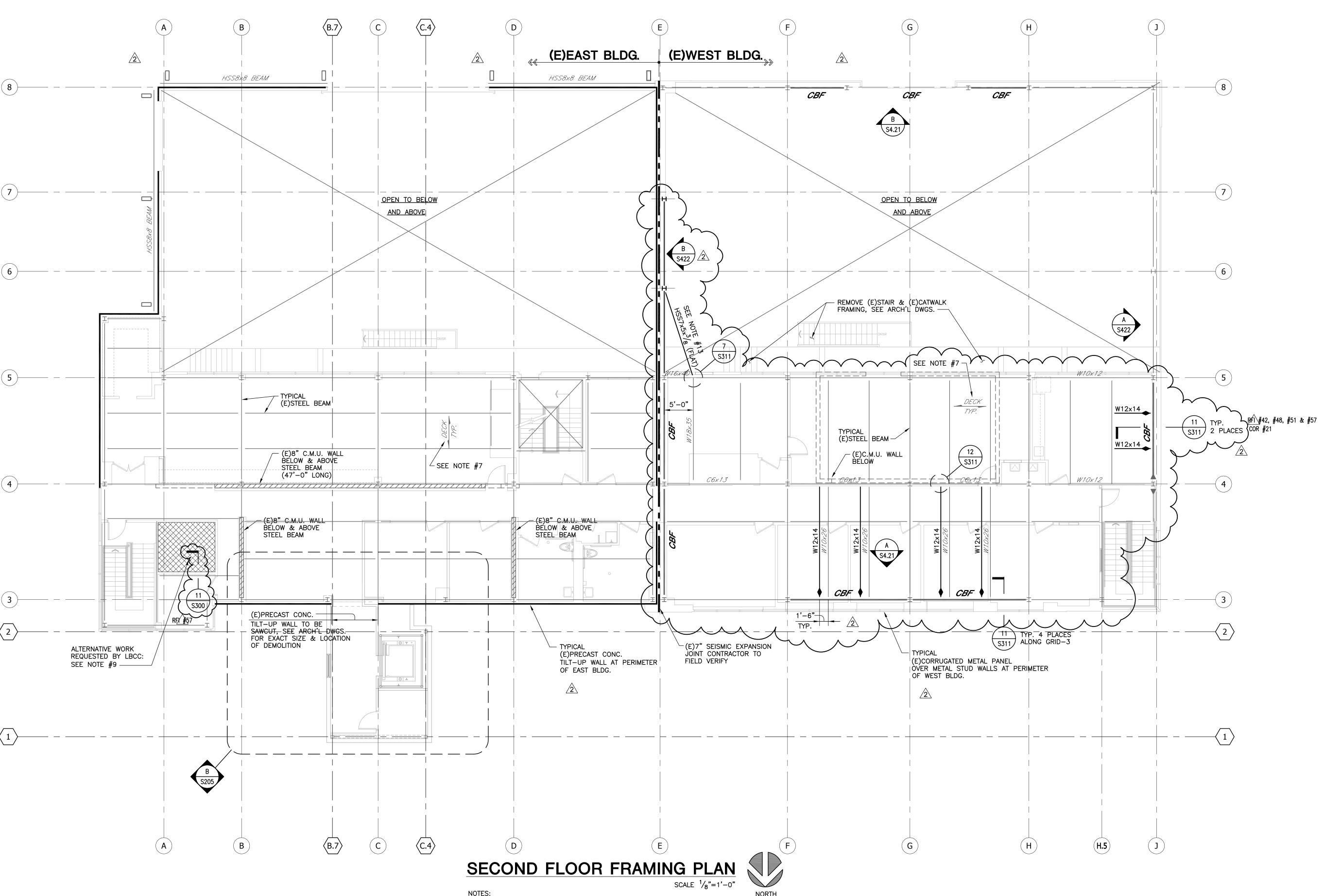


# BUILDING 1 FOUNDATION/FIRST FLOOR PLAN

| COMM. NO. | 3045-002-00    |
|-----------|----------------|
| SCALE     | 1/8"=1'-0"     |
| DATE      | August 8, 2011 |
| DRAWN     | STAFF          |

RECORD DRAWING

S201



NOTES:

1. FOR GENERAL NOTES, SEE SHEET S0.01.

- 2. FOR TYPICAL DETAILS SEE S1 SERIES SHEETS. DETAILS AND SCHEDULES INDICATED AS 'TYPICAL' MAY NOT BE SPECIFICALLY REFERENCED ON DRAWINGS. DETERMINE WHERE
- EACH DETAIL OR SCHEDULE APPLIES BEFORE PROCEEDING WITH WORK.

  3. VERIFY ALL DIMENSIONS WITH AS-BUILT CONDITION AND ARCHITECTURAL DRAWINGS PRIOR TO START OF WORK AND PREPARATION OF SHOP DRAWINGS.
- 4. SEE ARCHITECTURAL DRAWINGS FOR CONCRETE SLAB ELEVATIONS, DEPRESSIONS, SLOPES, OPENINGS, CURBS, DRAINS, TRENCHES, SLAB EDGE LOCATIONS, ETC., AND FOR WALL OVERALL DIMENSIONS, LOCATION OF OPENINGS, ETC., NOT INDICATED ON STRUCTURAL DRAWINGS.
- 5. STEEL MEMBER SIZES AND LOCATIONS SHOWN ON DRAWINGS ARE BASED ON FIELD OBSERVATION ONLY AND MAY NOT REFLECT THE ACTUAL EXISTING CONDITIONS. CONTRACTOR TO VERIFY IN FIELD ALL STEEL MEMBER SIZES AND LOCATIONS, INCLUDING TOP OF STEEL ELEVATION AND COMPOSITE METAL DECK THICKNESS, NOTIFY STRUCTURAL ENGINEER AND ARCHITECT IMMEDIATELY IF ANY OF THE MEMBER SIZE AND LOCATIONS DIFFER FROM THE DRAWINGS.
- 6. EXISTING FINISHED SLAB ELEVATION IS +114'-00", UNLESS NOTED OTHERWISE, VERIFY IN FIELD. EXISTING TOP OF STEEL ELEVATION IS  $+113'-5^3/_4"$ , UNLESS NOTED OTHERWISE, VERIFY IN FIELD. 7. EXISTING TYPICAL FLOOR DECK TO BE  $4^{1}/_{2}"$  CONCRETE OVER  $1^{1}/_{2}"$  (22 GA.) "B" DECK. CONTRACTOR TO VERIFY IN FIELD .
- 9. INFILL EXISTING SLAB OPENING WITH 3<sup>1</sup>/<sub>4</sub>" LIGHT WEIGHT CONCRETE OVER 20GA. VERCO W3 DECK w/#4@16"o.c. EACH WAY CENTERED AT MID—HEIGHT OF SLAB. FOR PRICING PURPOSES, PROVIDE ALLOWANCE FOR L3x3x<sup>1</sup>/<sub>4</sub> AROUND THE PERIMETER AND (2)W14x26x30'-0" BEAM TO SUPPORT THE EDGE OF NEW INFILLED SLAB. THE LOCATION AND SIZE OF W14x BEAM WILL BE CONFIRMED AFTER AS—BUILT CONDITION OF THE EXISTING BEAMS AND GIRDERS ARE VERIFIED IN FIELD.
- 10. ————— INDICATES EXISTING PRECAST CONCRETE TILT—UP WALL:

  TYPICAL 8" THICK WITH 1" OF ARCHITECTURAL REVEAL AND 6" THICK WITH 1"

  OF ARCHITECTURAL REVEAL FOR THE NORTH WALL ONLY.

- 11. CBF INDICATE EXISTING CONCENTRIC BRACE FRAME.
- 12.  $\longrightarrow$  INDICATES STIFFENER PLATE, SEE 2/S111 AND 9, 10, 11/S311.
- 13. CONTRACTOR TO FIELD LOCATE HSS7x5x BEAM TO AVOID ANY CONFLICTS WITH THE EXISTING CONDITIONS AND THE FUTURE LOCATION OF STORAGE RACKS, (SEE ARCHITECTURAL DRAWINGS).
- 14. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ANDY (E)CONCRETE SLAB OR MISC. STEEL, MECHANICAL SYSTEMS, CEILING, ELECTRICAL CONDUITS, LIGHT FIXTURES, STUCCO FINISH OR DRYWALL AS REQUIRED TO EXPOSE (E)STRUCTURAL STEEL AND PERFORM THE STRENGTHENING WORK AS INDICATED PER PLANS.
- 15. GRIND OFF ALL (E)GUSSET PLATES, PAINT, AND OTHER DEBRIS OVER ALL FRAMING MEMBERS THAT RECEIVE NEW BRACING ELEMENTS AND CONNECTIONS. (E)STEEL MEMBERS SHALL BE CLEANED TO ALLOW PROPER NEW STEEL CONNECTIONS.

CLIENT:

CLIENT:

CLIENT:

CLIENT:

CLITY
COLLEGE

CITY COLLEGE

CITY COLLEGE

4900 CONANT STREET, LONG BEACH,
CALIFORNIA 90808

CLIENT PROJECT NAME:
LONG BEACH CITY COLLEGE
BUILDING " O "
RECORD DRAWING

CLIENT PROJECT NUMBER:

3045-002-00

Architecture | Engineering | Planning
Hammel, Green and Abrahamson, Inc.
1880 Century Park East - Suite 608
Los Angeles, California USA 90067
Telephone 310.557.7600 Facsimile 310.553.1668

(626) 793-7847

(310) 782-0850

CONSULTANTS:

STRUCTURAL Job Number 09—G107
Englekirk & Sabol (323) 733-2640

CIVIL JMC2 (626) 793-7847

MECHANICAL / ELECTRICAL / PLUMBING M-E Engineers (310) 842-8700

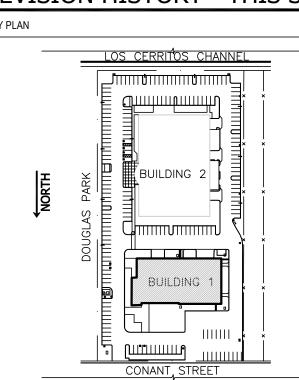
SIGNATUF

Schirmer Engineering



| ∆ 50% CD BID PACKAGE #4 | 08-28-09 |
|-------------------------|----------|
| CONSTRUCTION DOCUMENTS  | 09-30-09 |
|                         | 10-22-09 |
| 2 ADDENDUM #2           | 12-09-09 |
| RECORD DRAWING          | 08-08-11 |
|                         |          |
|                         |          |
| $\triangle$             |          |
| $\triangle$             |          |
| $\wedge$                |          |

REVISION HISTORY - THIS SHEET



BUILDING 1 SECOND FLOOR FRAMING PLAN

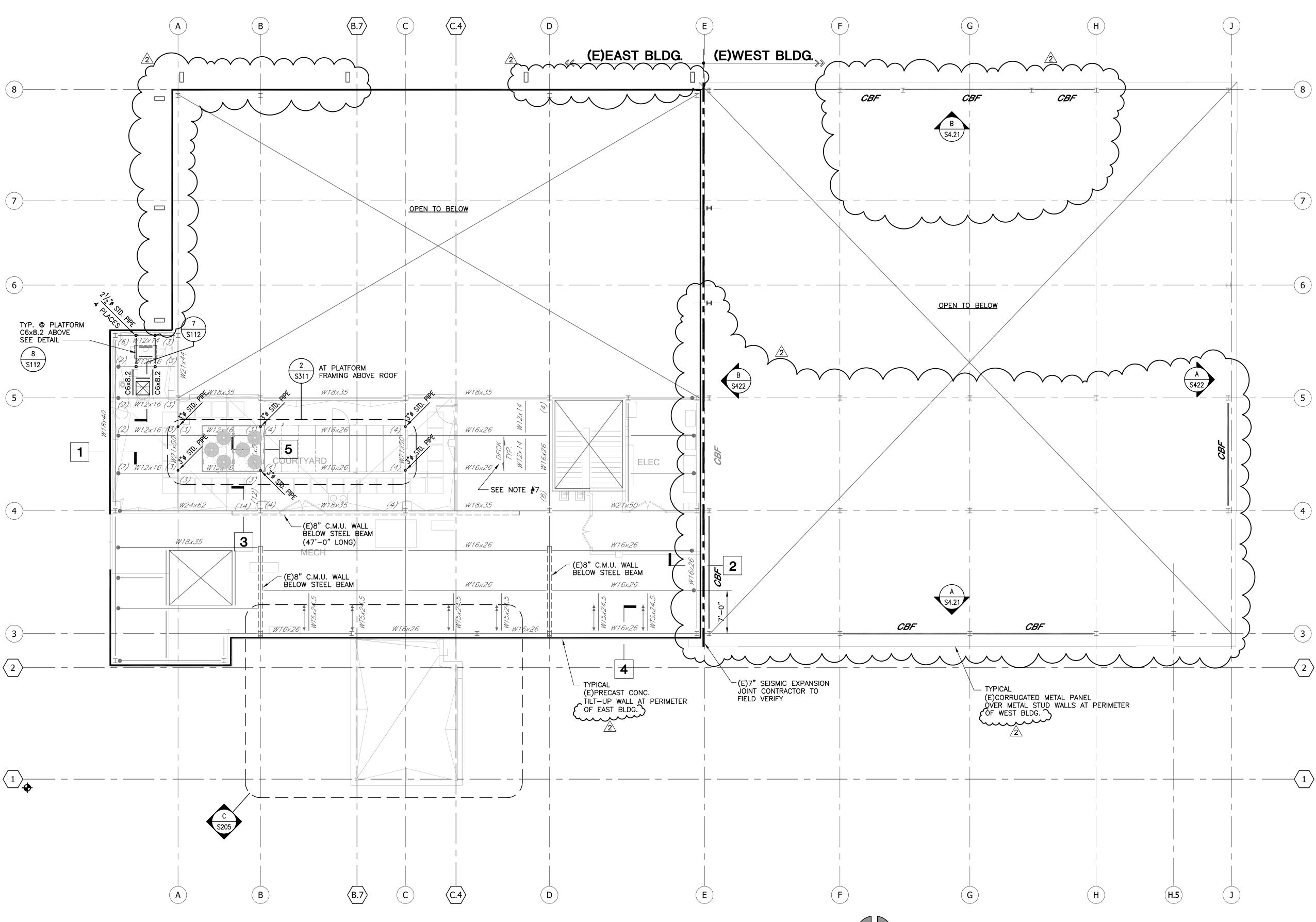
COMM. NO. 3045-002-00
SCALE 1/8"=1'-0"
DATE August 8, 2011
DRAWN STAFF

RECORD DRAWING

S202

© COPYRIGHT HAMMEL GREEN AND ABRAHAMSON, INC.

W:\Projects\09G107\S202.dwg, 8/2/2011 2:59:17 PM, Bluebeam PDF8 Printer HighRes.pc3



# THIRD FLOOR / ROOF FRAMING PLAN



SCALE  $\frac{1}{8}$ "=1'-0"

NOTES: 1. FOR GENERAL NOTES, SEE SHEET SO.01.

2. FOR TYPICAL DETAILS SEE S1 SERIES SHEETS. DETAILS AND SCHEDULES INDICATED AS

'TYPICAL' MAY NOT BE SPECIFICALLY REFERENCED ON DRAWINGS. DETERMINE WHERE

EACH DETAIL OR SCHEDULE APPLIES BEFORE PROCEEDING WITH WORK.

3. VERIFY ALL DIMENSIONS WITH AS-BUILT CONDITION AND ARCHITECTURAL DRAWINGS PRIOR

TO START OF WORK AND PREPARATION OF SHOP DRAWINGS.

4. SEE ARCHITECTURAL DRAWINGS FOR CONCRETE SLAB ELEVATIONS, DEPRESSIONS, SLOPES, OPENINGS, CURBS, DRAINS, TRENCHES, SLAB EDGE LOCATIONS, ETC., AND FOR WALL OVERALL DIMENSIONS, LOCATION OF OPENINGS, ETC., NOT INDICATED ON STRUCTURAL DRAWINGS.

5. STEEL MEMBER SIZES AND LOCATIONS SHOWN ON DRAWINGS ARE BASED ON FIELD OBSERVATION ONLY AND MAY NOT REFLECT THE ACTUAL EXISTING CONDITIONS. CONTRACTOR TO VERIFY IN FIELD ALL STEEL MEMBER SIZES AND LOCATIONS, INCLUDING TOP OF STEEL ELEVATION AND COMPOSITE METAL DECK THICKNESS, NOTIFY STRUCTURAL ENGINEER AND ARCHITECT IMMEDIATELY IF ANY OF THE MEMBER SIZE AND LOCATIONS DIFFER FROM THE DRAWINGS.

6. EXISTING FINISHED SLAB ELEVATION IS +126'-11", UNLESS NOTED OTHERWISE, VERIFY IN FIELD. EXISTING TOP OF STEEL ELEVATION IS  $+126'-4\frac{3}{4}$ ", UNLESS NOTED OTHERWISE, VERIFY IN FIELD. 7. EXISTING MECHANICAL PENTHOUSE FLOOR TO BE 6" CONCRETE OVER  $1\frac{1}{2}$ " (22 GA.) "B" DECK, CONTRACTOR TO VERIFY IN FIELD.

8.  $\leftarrow$  INDICATES EXISTING (2)L3 $\frac{1}{2}$ x3 $\frac{1}{2}$ x3 $\frac{3}{8}$  KICKER.

9. (3) INDICATES EXISTING BEAM AND SIZE.

/-INDICATES NUMBER OF EXISTING BOLTS OBSERVED IN THE FIELD.

- INDICATES EXISTING WALL ANCHORAGE CONNECTION OBSERVED IN THE FIELD. 10. W12x16 INDICATES NEW STEEL BEAM AND SIZE.

INDICATES EXISTING PRECAST CONCRETE TILT-UP WALL

13. CBF INDICATE EXISTING CONCENTRIC BRACE FRAME.

INDICATES EXISTING STRUCTURAL CONNECTIONS SURVEYED BY TWINING LAB, SEE REPORT 090537.1

14. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ANDY (E)CONCRETE SLAB OR MISC. STEEL, MECHANICAL SYSTEMS, CEILING, ELECTRICAL CONDUITS, LIGHT FIXTURES, STUCCO FINISH OR DRYWALL AS REQUIRED TO EXPOSE (E)STRUCTURAL STEEL AND PERFORM THE STRENGTHENING WORK AS INDICATED PER PLANS. > 15. GRIND OFF ALL (E)GUSSET PLATES, PAINT, AND OTHER DEBRIS OVER ALL FRAMING MEMBERS THAT RECEIVE NEW BRACING ELEMENTS AND CONNECTIONS. (E)STEEL MEMBERS SHALL BE CLEANED TO ALLOW PROPER NEW STEEL CONNECTIONS.

# LONG BEACH CITY COLLEGE

CALIFORNIA 90808 CLIENT PROJECT NAME: LONG BEACH CITY COLLEGE BUILDING " O " RECORD DRAWING

4900 CONANT STREET, LONG BEACH,

CLIENT PROJECT NUMBER: 3045-002-00

> Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc.

1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

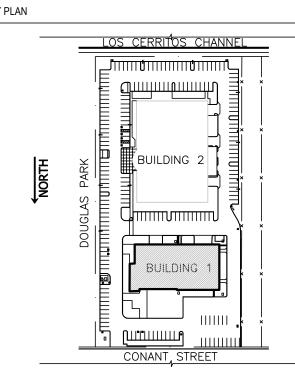
(323) 733-2640 (626) 793-7847 (310) 842-8700 (626) 793-7847 Schirmer Engineering

(310) 782-0850



| DEVICEON LITOTODY       | T. 170 OL 1557 |
|-------------------------|----------------|
|                         |                |
|                         |                |
|                         |                |
|                         |                |
|                         |                |
| RECORD DRAWING          | 08-08-11       |
| ADDENDUM #2             | 12-09-09       |
| 100% CD                 | 10-22-09       |
| CONSTRUCTION DOCUMENTS  | 09-30-09       |
| ∑ 50% CD BID PACKAGE #4 | 08-28-09       |
|                         |                |

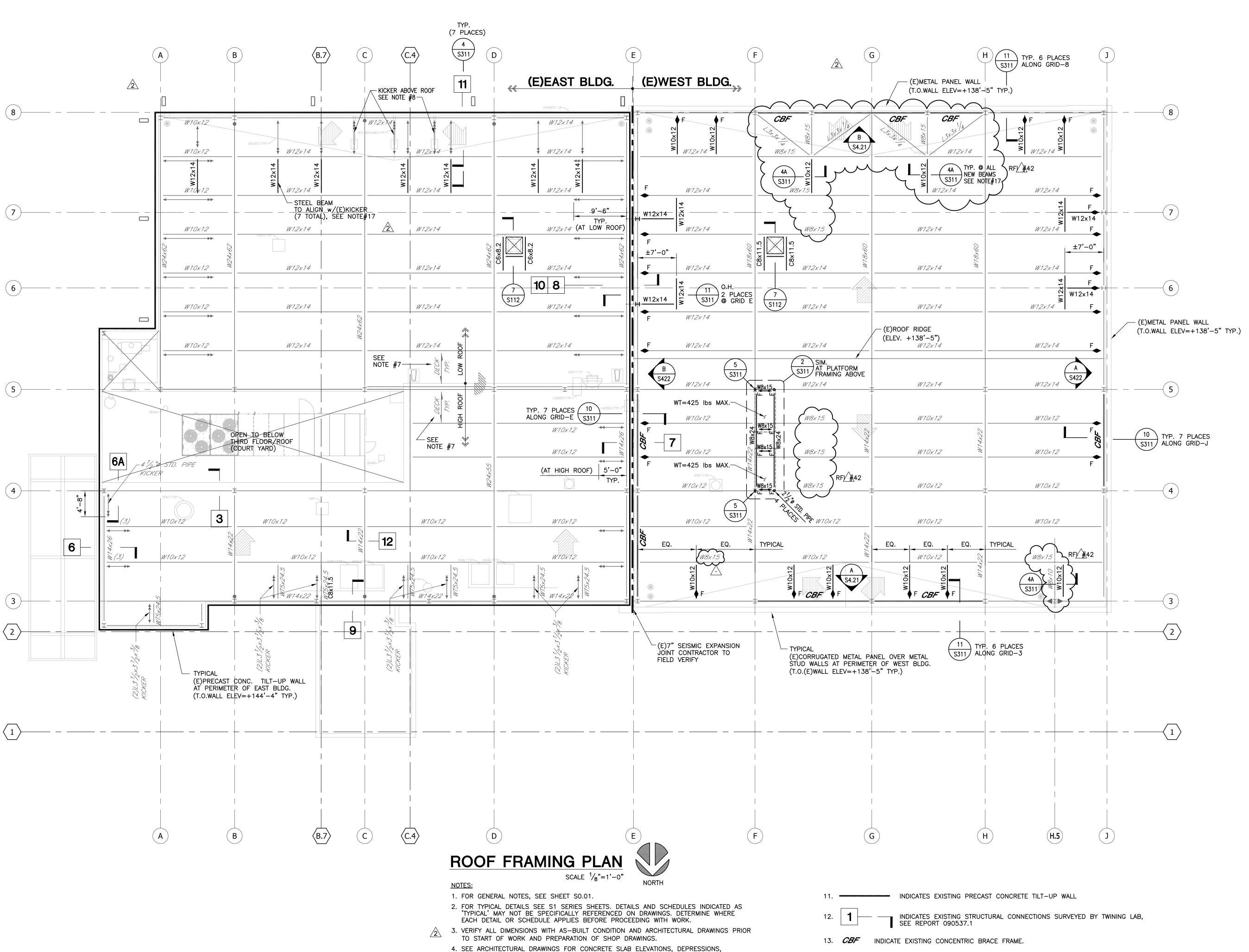
**REVISION HISTORY - THIS SHEET** 



# BUILDING 1 THIRD FLOOR FRAMING PLAN

|  | COMM. NO. | 3045-002-00    |
|--|-----------|----------------|
|  | SCALE     | 1/8"=1'-0"     |
|  | DATE      | August 8, 2011 |
|  | DRAWN     | STAFF          |

RECORD DRAWING



SLOPES, OPENINGS, CURBS, DRAINS, TRENCHES, SLAB EDGE LOCATIONS, ETC., AND FOR

5. STEEL MEMBER SIZES AND LOCATIONS SHOWN ON DRAWINGS ARE BASED ON FIELD OBSERVATION

6. EXISTING FINISHED ROOF ELEVATION (AT RIDGE LINE) AND TYPICAL TOP OF PRECAST CONCRETE

7. EXISTING TYPICAL ROOF DECK TO BE RIGID INSULATION OVER  $1\frac{1}{2}$ " (22 GA.) "B" DECK, CONTRACTOR TO VERIFY IN FIELD.

INDICATES EXISTING STEEL KICKER ABOVE ROOF.

(3) —INDICATES NUMBER OF EXISTING BOLTS OBSERVED IN THE FIELD.

ONLY AND MAY NOT REFLECT THE ACTUAL EXISTING CONDITIONS. CONTRACTOR TO VERIFY IN FIELD

ALL STEEL MEMBER SIZES AND LOCATIONS. INCLUDING TOP OF STEEL ELEVATION AND COMPOSITE

METAL DECK THICKNESS, NOTIFY STRUCTURAL ENGINEER AND ARCHITECT IMMEDIATELY IF ANY OF

INDICATES EXISTING (2)L3 $\frac{1}{2}$ x3 $\frac{1}{2}$ x $\frac{1}{4}$  KICKER, UNLESS NOTED OTHERWISE

- INDICATES EXISTING WALL ANCHORAGE CONNECTION OBSERVED IN THE FIELD.

WALL OVERALL DIMENSIONS, LOCATION OF OPENINGS, ETC., NOT INDICATED ON

THE MEMBER SIZE AND LOCATIONS DIFFER FROM THE DRAWINGS.

EXISTING FINISHED PENTHOUSE ROOF ELEVATION IS +138'-5".

W12x16 INDICATES EXISTING BEAM AND SIZE.

10. W12x16 INDICATES NEW STEEL BEAM AND SIZE.

TILT-UP WALL IS +144'-4", UNLESS NOTED OTHERWISE, VERIFY IN FIELD.

STRUCTURAL DRAWINGS.

- 14. INDICATES STIFFENER PLATE, SEE 2/S111 & 9, 10, 11/S311.
- 15. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ANDY (E)CONCRETE SLAB OR MISC. STEEL, MECHANICAL SYSTEMS, CEILING, ELECTRICAL CONDUITS, LIGHT FIXTURES, STUCCO FINISH OR DRYWALL AS REQUIRED TO EXPOSE (E)STRUCTURAL STEEL AND PERFORM THE STRENGTHENING WORK AS INDICATED PER PLANS.
- 16. GRIND OFF ALL (E)GUSSET PLATES, PAINT, AND OTHER DEBRIS OVER ALL FRAMING MEMBERS THAT RECEIVE NEW BRACING ELEMENTS AND CONNECTIONS. (E)STEEL MEMBERS SHALL BE CLEANED TO ALLOW PROPER NEW STEEL CONNECTIONS.
- 17. CONTRACTOR TO PROVIDE ALLOWANCE FOR ANY POTENTIAL REPAIR OF ROOFING MEMBRANE THAT MAY BE REQUIRED DURING INSTALLATION OF NEW BEAMS/RETROFIT.

3045-002-00

August 8, 2011

1/8"=1'-0"

LONG BEACH

CITY COLLEGE

Architecture | Engineering | Planning

Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608

Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640

(626) 793-7847

(310) 842-8700

(626) 793-7847

(310) 782-0850

08-28-09

09-30-09

10-22-09

12-09-09

08-08-11

4900 CONANT STREET, LONG BEACH,

CALIFORNIA 90808

LONG BEACH CITY COLLEGE

CLIENT PROJECT NAME:

BUILDING " O "

RECORD DRAWING

CLIENT PROJECT NUMBER:

DATA / TELECOM Vantage Technology Consulting Group

√ 50% CD BID PACKAGE #4

100% CD

ADDENDUM #2

**BUILDING 1** 

FRAMING PLAN

RECORD DRAWING

CONSTRUCTION DOCUMENTS

**REVISION HISTORY - THIS SHEET** 

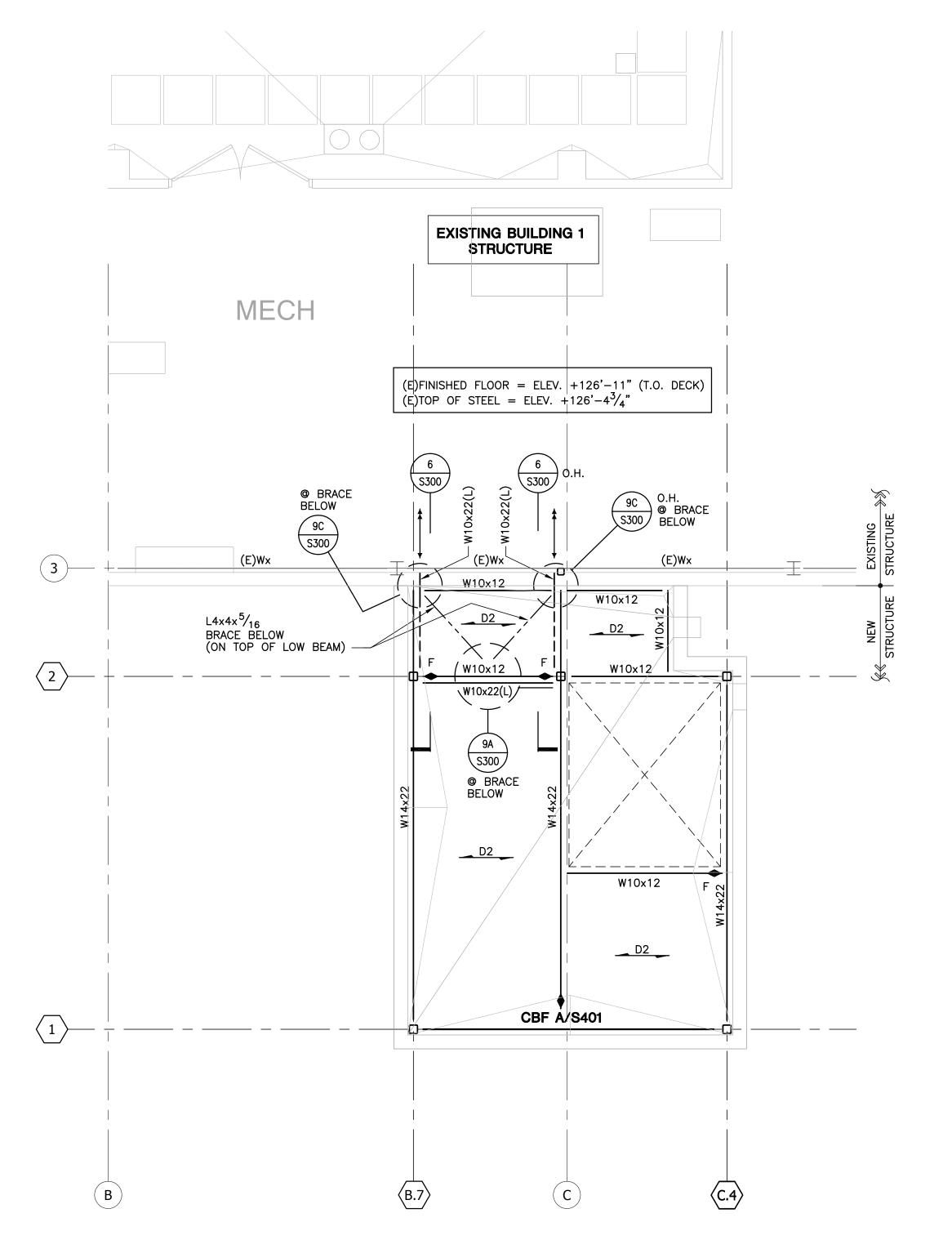
LOS CERRITOS CHANN

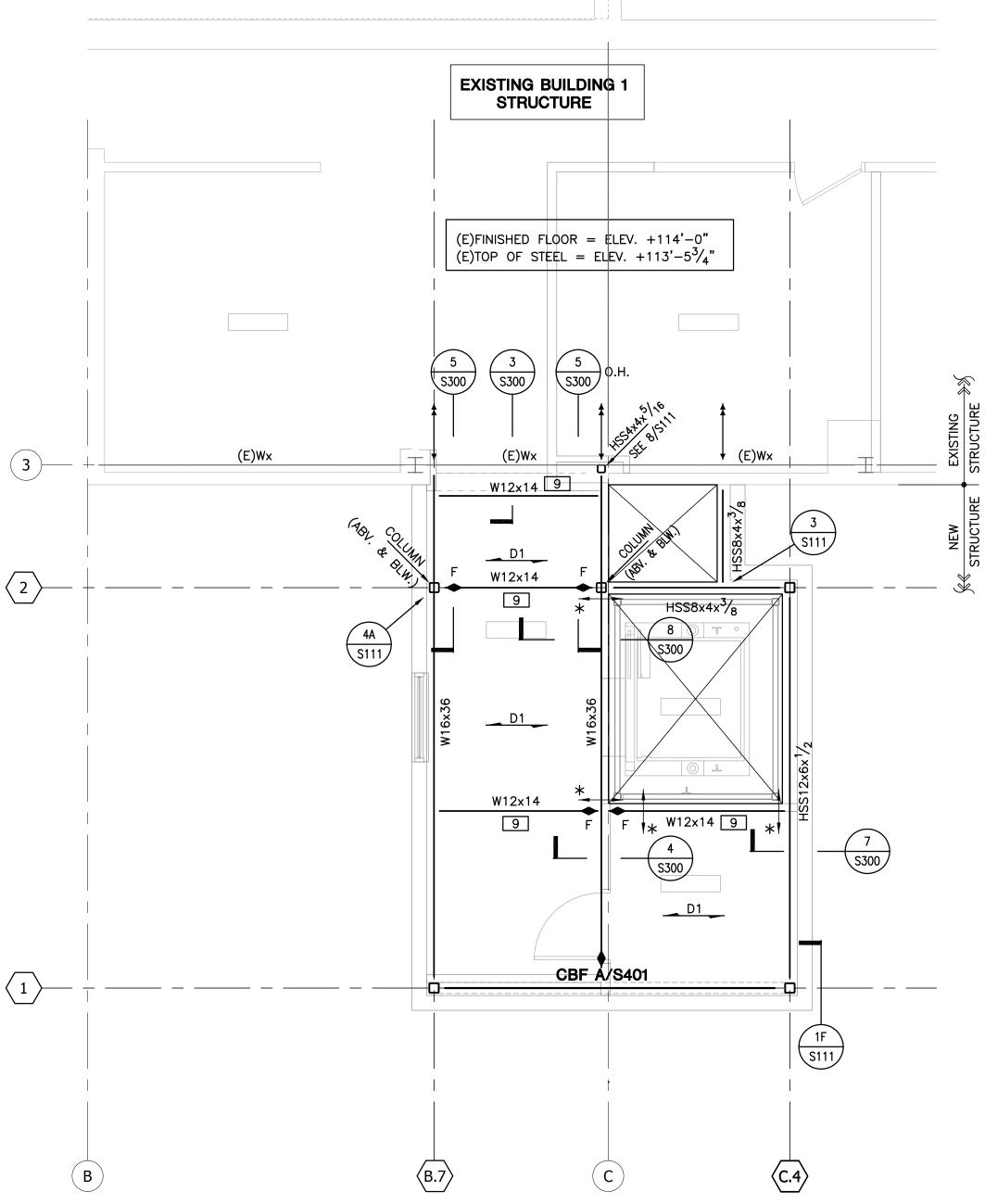
SECURITY
Schirmer Engineering

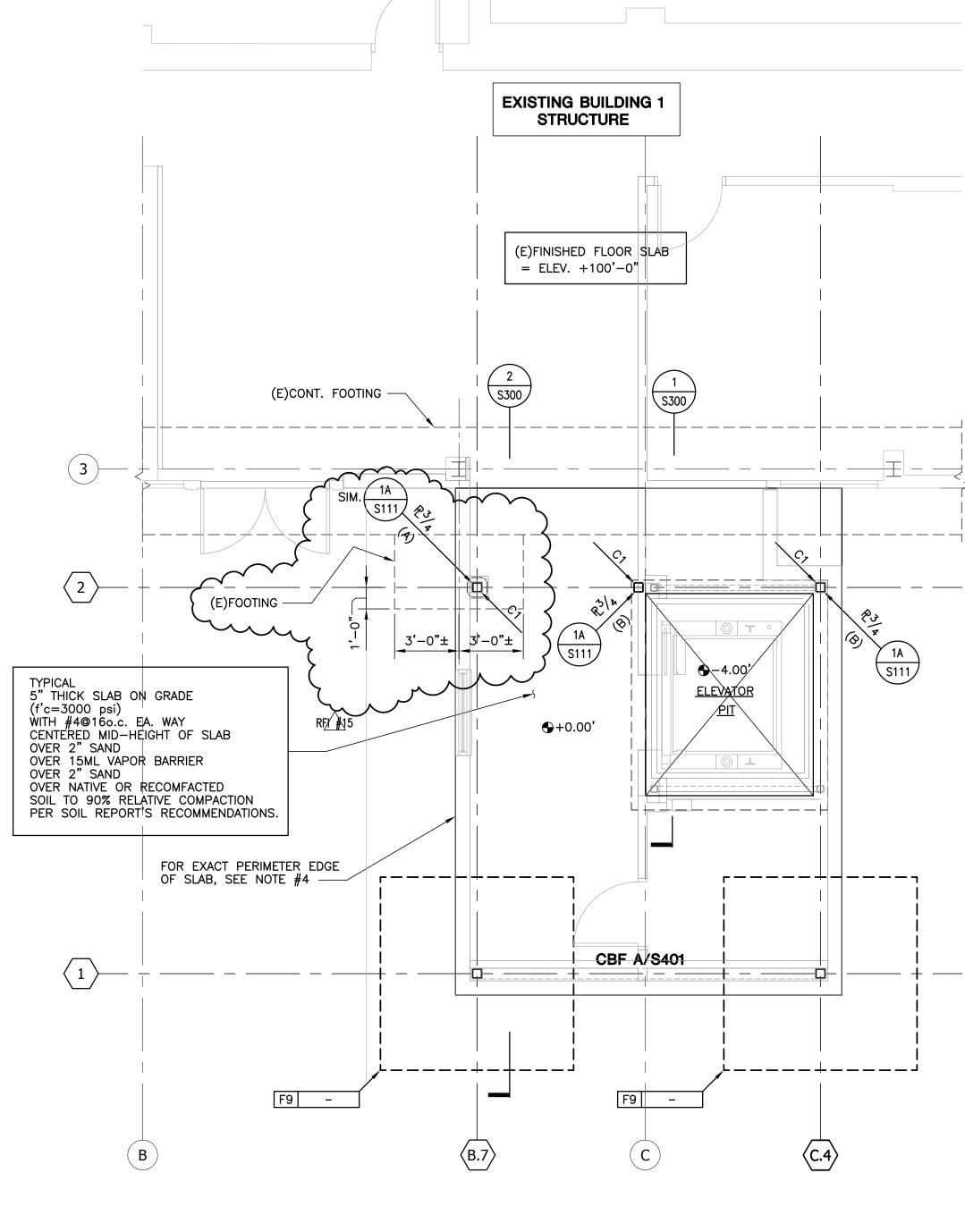
3045-002-00

© COPYRIGHT HAMMEL GREEN AND ABRAHAMSON, INC.

RECORD DRAWING







# AT ELEVATOR SHAFT ROOF/ THIRD FLOOR FRAMING PLAN (C)

-TOP OF STEEL DECK ELEVATION =  $+128'-7\frac{1}{2}$ "
TOP OF STEEL ELEVATION = +128'-6", UNLESS NOTED OTHERWISE PER ARCHITECTURAL

# AT ELEVATOR SHAFT

SECOND FLOOR FRAMING PLAN (B)

-TOP OF CONCRETE SLAB ELEVATION = +114'-0" TOP OF STEEL ELEVATION = +113'-5", UNLESS NOTED OTHERWISE PER ARCHITECTURAL

# **TYPICAL PLAN NOTES:**

- 1. FOR GENERAL NOTES, SEE SHEET SO.01.
- 2. FOR TYPICAL DETAILS SEE S1 SERIES SHEETS. DETAILS AND SCHEDULES INDICATED AS 'TYPICAL' MAY NOT BE SPECIFICALLY REFERENCED ON DRAWINGS. DETERMINE WHERE EACH DETAIL OR SCHEDULE APPLIES BEFORE PROCEEDING WITH WORK.
- 3. VERIFY ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO START OF WORK.
- 4. SEE ARCHITECTURAL DRAWINGS FOR CONCRETE SLAB ELEVATIONS, DEPRESSIONS, SLOPES, OPENINGS, CURBS, DRAINS, TRENCHES, SLAB EDGE LOCATIONS, ETC., AND FOR WALL OVERALL DIMENSIONS, LOCATION OF OPENINGS, ETC., NOT INDICATED ON STRUCTURAL DRAWINGS.

INDICATES TOP OF FOOTING ELEVATION. ALL FOOTINGS TO BE (-1.50') BELOW TOP OF FINISH FLOOR OR LOWEST ADJACENT CONCRETE SLAB, WHICHEVER IS LOWER UNLESS NOTED OTHERWISE THUS ±0.00'. - INDICATES FOOTING MARK, SEE CONCRETE FOOTING SCHEDULE

INDICATES  $HSS5x5x^{1}/_{4}$  STEEL COLUMN WITH  $(4)^{3}/_{4}$ " ø F1554 (GR.55) ANCHOR BOLTS. 7. 

WX

INDICATES STEEL BEAM STIFFINER, SEE DETAIL 2/S111.

- 8. D1 INDICATES DIRECTION OF STEEL DECK AND SLAB CONSTRUCTION, SEE SCHEDULE 1/S112.
- 9. CBF A/S401 INDICATES CONCENTRIC BRACE FRAME, SEE SHEET REFERENCE ELEVATION AS SHOWN.
- 10. \* INDICATES MAXIMUM HORIZONTAL SERVICE REACTION LOAD FROM THE ELEVATOR SHALL NOT EXCEED 3,500 lbs.
- 11. ← → INDICATES ANGLE BRACE, SEE DETAIL 7/S111.
- 12. 9 INDICATES NUMBER OF NELSON STUD REQUIRED IN LIEU OF MANDATORY SPACING OF STUDS, SEE 1/S113.
- 13. CONTRACTOR TO VERIFY ALL AS-BUILT DIMENSIONS INCLUDING TOP OF STEEL, TOP OF FINISHED FLOOR, EDGE OF SLAB AND OPENINGS, ETC. PROR TO START OF ANY WORK AND PREPARATION OF SHOP DRAWINGS.

# AT ELEVATOR SHAFT

FOUNDATION/FIRST FLOOR PLAN (A)

-TOP OF SLAB ELEVATION SHALL BE  $+100'-0" = \bigoplus (+0.00')$  UNLESS NOTED OTHERWISE.

|             | CON                                | CRETE I                                               | FOOTING                                               | SCHE                                                                                             | DULE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                  |
|-------------|------------------------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| SIZE        | DEPTH                              | REINFORG                                              | CING BOTT.                                            | REINFOR                                                                                          | CING TOP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DEMARK                                                                           |
| (feet)      | (inches)                           | LONG                                                  | SHORT                                                 | LONG                                                                                             | SHORT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | REMARK                                                                           |
| 5' 0"×5' 0" | 18                                 | N 0)#                                                 | FEWSED                                                |                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                  |
| 9'-0"x9'-0" | 36                                 | (10)#                                                 | #7 E.W.                                               | (10)#5                                                                                           | 5 E.W.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                  |
|             |                                    |                                                       |                                                       |                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                  |
|             |                                    |                                                       |                                                       |                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                  |
|             | "L" x "W"<br>(feet)<br>5' 0"×5' 0" | SIZE DEPTH "L" x "W" (feet) (inches)  5' 0"×5' 0"  18 | SIZE "L" x "W" (feet)  (inches)  5' 0"x5' 0"  18  N 0 | SIZE "L" x "W" (feet)  (inches)  5' 0"×5' 0"  18  REINFORCING BOTT. LONG SHORT  N @ #F E M S E E | SIZE "L" x "W" (feet)  Concept | "L" x "W" (feet) (inches) LONG SHORT LONG SHORT  5' 0"x5' 0" 18 N O)#F E N S E D |

- ALL FOOTINGS TO BE CENTERED ON COLUMNS AND GRID LINES UNLESS NOTED OTHERWISE ON PLAN.

LONG BEACH CITY COLLEGE

| 4900 CONANT STREET, LONG BEACH,<br>CALIFORNIA 90808                                                                                                                                         |    |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--|
| CLIENT PROJECT NAME:                                                                                                                                                                        |    |  |
| LONG BEACH CITY COLLEGE                                                                                                                                                                     |    |  |
| BUILDING " O "                                                                                                                                                                              |    |  |
| RECORD DRAWING                                                                                                                                                                              |    |  |
| CLIENT PROJECT NUMBER:                                                                                                                                                                      | _  |  |
| 3045-002-00                                                                                                                                                                                 |    |  |
| ARCHITECT:                                                                                                                                                                                  |    |  |
| Architecture   Engineering   Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668 | 58 |  |
| CONSULTANTS:                                                                                                                                                                                | -  |  |
| STRUCTURAL Joh Number 00-C107                                                                                                                                                               |    |  |

(323) 733-2640

(626) 793-7847

(310) 842-8700

(626) 793-7847

(310) 782-0850

SECURITY
Schirmer Engineering



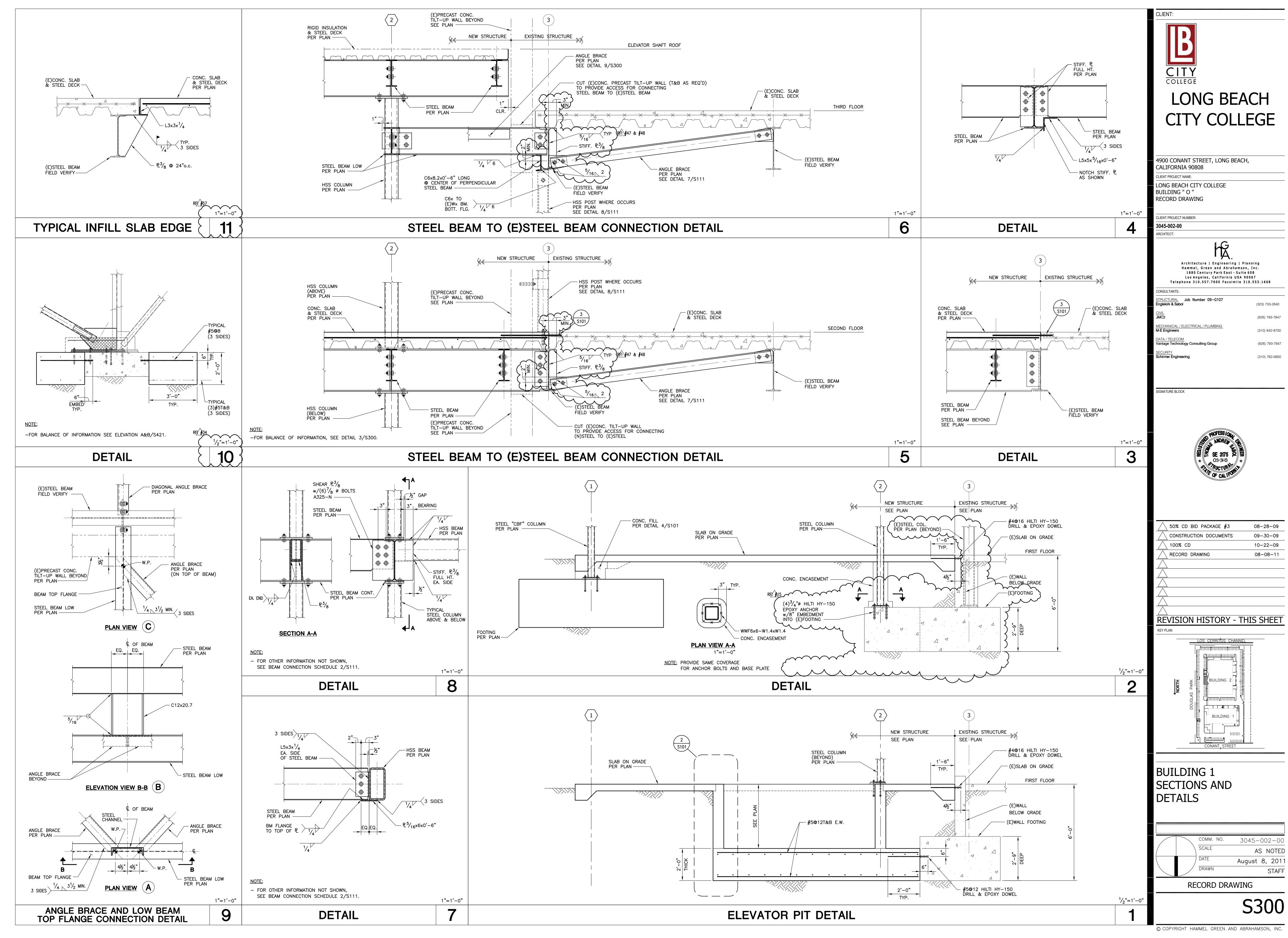
| ∑ 50% CD BID PACKAGE #3 | 08-28-09 |
|-------------------------|----------|
| CONSTRUCTION DOCUMENTS  | 09-30-09 |
| \ 100% CD               | 10-22-09 |
| RECORD DRAWING          | 08-08-11 |
|                         |          |
|                         |          |
|                         |          |
|                         |          |
|                         |          |
|                         |          |

**REVISION HISTORY - THIS SHEET** 

| PLAN                |                                                             |
|---------------------|-------------------------------------------------------------|
| NORTH               | LOS CERRITOS CHANNEL  X  X  X  X  X  X  X  X  X  X  X  X  X |
| ELEVATOR<br>SHAFT — | BUILDING 1                                                  |

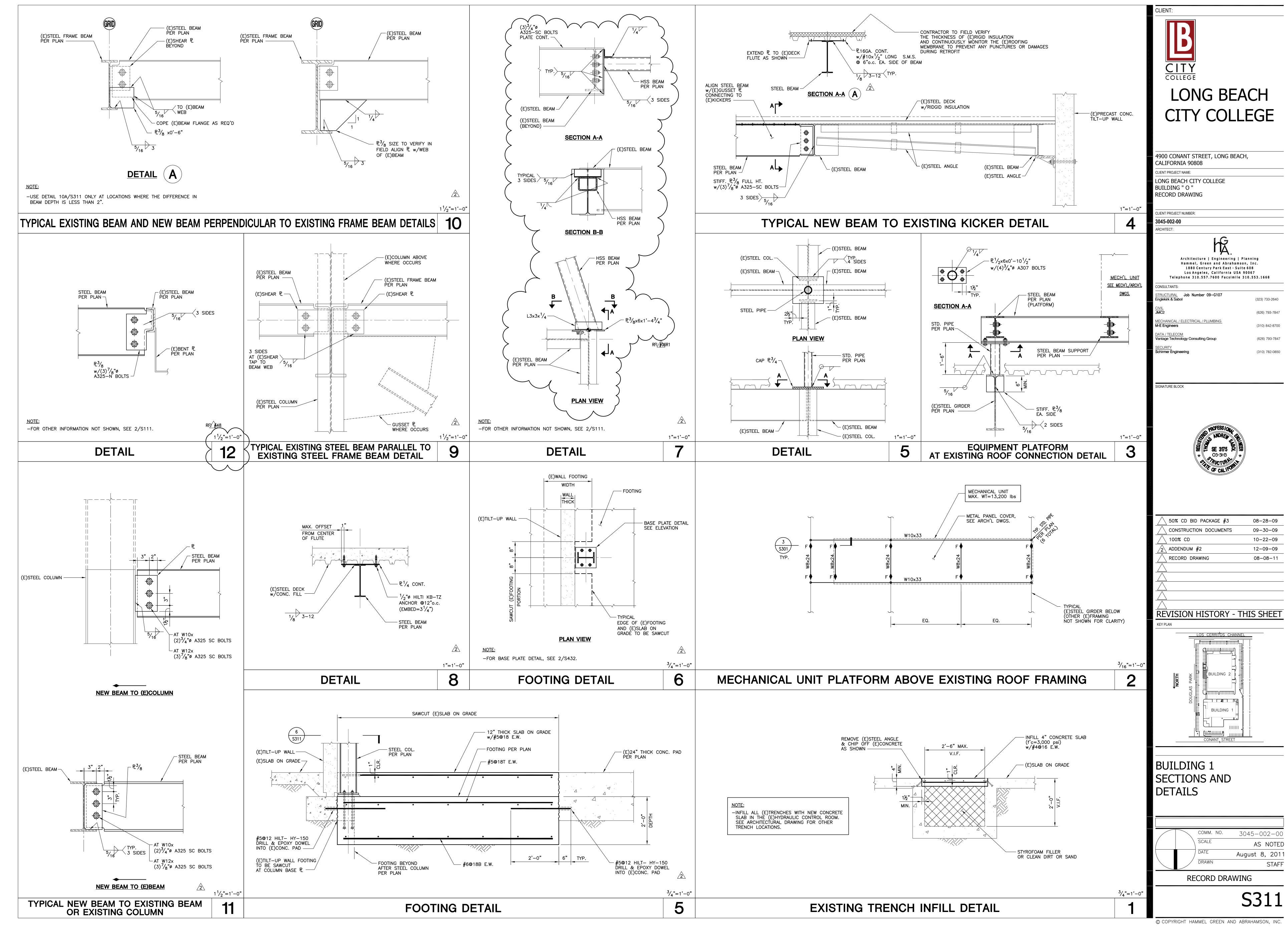
BUILDING 1 ELEVATOR SHAFT

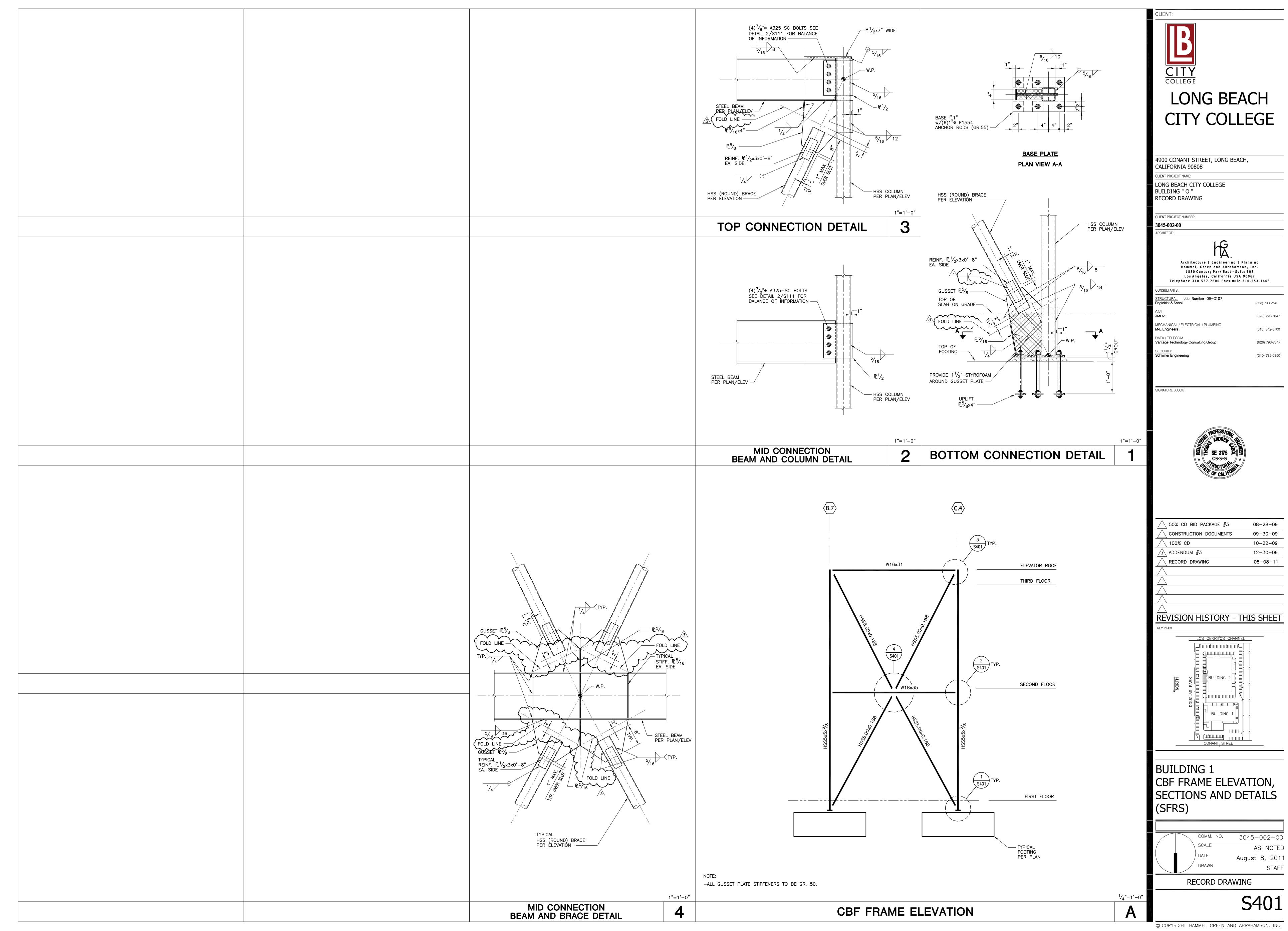
|                |  | COMM. 1 | NO. 3045- | 002-00   |  |  |
|----------------|--|---------|-----------|----------|--|--|
|                |  | SCALE   | 1/4       | -"=1'-0" |  |  |
|                |  | DATE    | August    | 8, 2011  |  |  |
|                |  | DRAWN   |           | STAFF    |  |  |
| RECORD DRAWING |  |         |           |          |  |  |

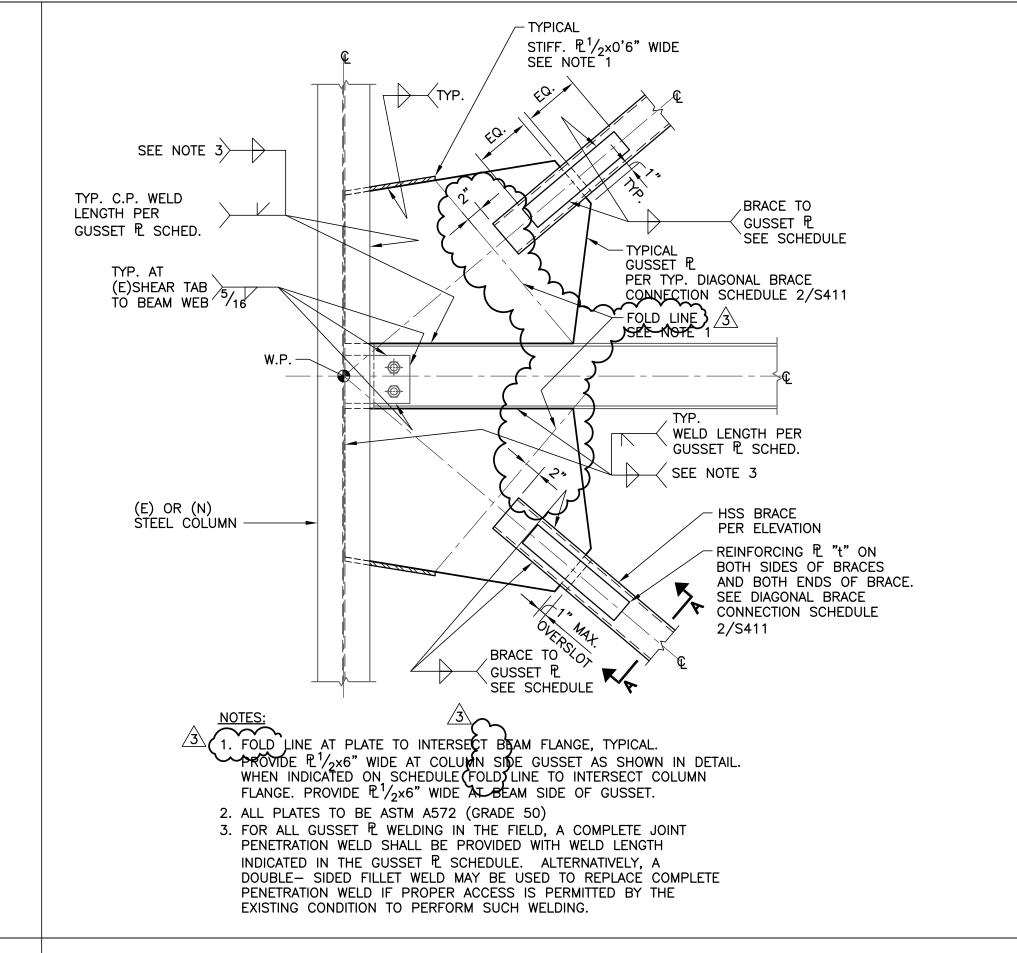


rojects/09G107/S300 dwg. 8/2/2011 2:58:43 PM. Bluebeam PDF8 Printer HighRes p.c.3

GREEN AND ABRAHAMSON, INC.







|                                      | TYPICAL DIAGONAL BRACE CONNECTION SCHEDULE |                                      |                 |              |                                                    |         |  |  |  |  |
|--------------------------------------|--------------------------------------------|--------------------------------------|-----------------|--------------|----------------------------------------------------|---------|--|--|--|--|
| BRACE SIZE                           | GUSSET P                                   | BRACE TO GUSSET P                    | REINFORCING P   | LATE (GR.50) | REINFORCING P                                      |         |  |  |  |  |
| (PER ELEVATION)                      | (GR.50)                                    | WELDING<br>FILLET SIZE X MIN. LENGTH | P THICKNESS "t" | P WIDTH "w"  | TO BRACE WELDING FILLET SIZE "t" × MIN. LENGTH "L" | REMARKS |  |  |  |  |
| HSS6x6x <sup>3</sup> / <sub>8</sub>  | 1"                                         | <sup>7</sup> / <sub>16</sub> – 13    | 1/2             | 4            | <sup>5</sup> / <sub>16</sub> – 18                  | -       |  |  |  |  |
| HSS5x5x <sup>5</sup> / <sub>16</sub> | 3/4"                                       | <sup>3</sup> / <sub>8</sub> – 11     | 1/2             | 3            | <sup>5</sup> / <sub>16</sub> – 15                  | _       |  |  |  |  |
|                                      |                                            |                                      |                 |              |                                                    |         |  |  |  |  |

**GUSSET PLATE SCHEDULE** 

COLUMN LET SIZE x MIN. LENGTH FLANGE WEB

**NOT USED** 

**VARIES** 

1'-0"

SEE NOTE

-STIFFENER

 $\frac{3}{4}$  - 21

**GUSSET WELDING TO** 

 $\frac{3}{4}$  - 23

 $\frac{3}{4}$  - 18

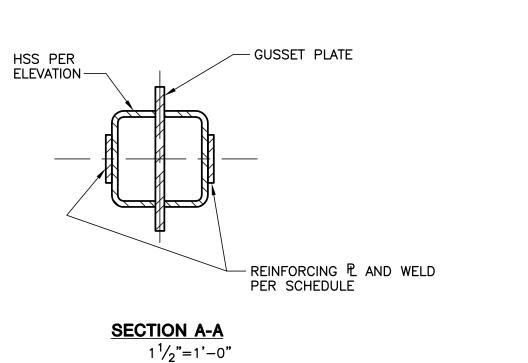
**MARK** 

1B

1D

(E)BASE PL SIZE TO V.I.F.-

75% P.P.



|      | GUSSET PLATE SCHEDULE            |                      |                    |                          |  |  |  |  |
|------|----------------------------------|----------------------|--------------------|--------------------------|--|--|--|--|
|      | GUSSET W                         | ELDING               |                    |                          |  |  |  |  |
| MARK | BEAM                             | COL<br>FILLET SIZE X | UMN<br>MIN. LENGTH | REMARKS                  |  |  |  |  |
|      | FILLET SIZE x MIN. LENGTH        | FLANGE               | WEB                |                          |  |  |  |  |
| 2A   |                                  | NC                   | OT US              | ED                       |  |  |  |  |
| 2B   | $\frac{3}{4} - 23$               | _                    | $\frac{3}{4}$ - 26 | NORTH FRAME              |  |  |  |  |
| 2C   | $\frac{3}{4}$ - 22               | _                    | $\frac{3}{4}$ - 19 | NORTH FRAME              |  |  |  |  |
| 2D   | $\frac{3}{4}$ – 20               | $\frac{3}{4}$ - 19   | _                  | EAST FRAME               |  |  |  |  |
| 2E   | <sup>3</sup> / <sub>4</sub> – 18 | $\frac{3}{4}$ – 19   | _                  | EAST FRAME               |  |  |  |  |
| 2F   | <sup>3</sup> / <sub>4</sub> - 16 | _                    | $\frac{3}{4}$ - 16 | SOUTH FRAME              |  |  |  |  |
| 2G   | <sup>3</sup> / <sub>4</sub> – 33 | _                    | $\frac{3}{4}$ - 23 | SOUTH FRAME AT ROOF ONLY |  |  |  |  |
|      |                                  |                      |                    |                          |  |  |  |  |

REMARKS

WEST FRAME

NORTH FRAME

EAST FRAME

SOUTH FRAME

-3" GROUT HOLE

- EXTENT OF SLAB

DEMOLITION SEE NOTE 5

 $w/(6)^{3}/_{4}$ ø HY-150 EPOXY ANCHOR (ASTM A193B7)

REINFORCING PL"t" EA. SIDE OF BRACE AND BOTH ENDS OF

CONNECTION SCHEDULE 2/S411

GUSSET PL PER TYP. DIAGONAL BRACE

1"=1'-0"

CONNECTION SCHEDULE 2/S411

BRACE. SEE DIAGONAL BRACE

SEE SCHEDULE 2/S411

GROUT TO MATCH
(E)GROUT THICKNESS

7. FOR ALL GUSSET PL WELDING IN THE FIELD, A COMPLETE JOINT

PENETRATION WELD SHALL BE PROVIDED WITH WELD LENGTH

(323) 733-2640 1"=1'-0" (626) 793-7847 HANICAL / ELECTRICAL / PLUMBING (310) 842-8700

LONG BEACH

CITY COLLEGE

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc.

1880 Century Park East - Suite 608

Los Angeles, California USA 90067

Telephone 310.557.7600 Facsimile 310.553.1668

(626) 793-7847

(310) 782-0850

4900 CONANT STREET, LONG BEACH,

CALIFORNIA 90808

LONG BEACH CITY COLLEGE

CLIENT PROJECT NAME:

BUILDING " O "

RECORD DRAWING

LIENT PROJECT NUMBER:

3045-002-00

RCHITECT:

Schirmer Engineering

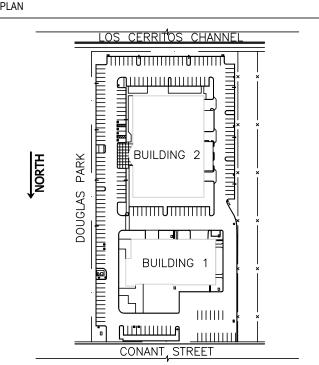
DATA / TELECOM
Vantage Technology Consulting Group

CLIENT:



| ^                      |          |
|------------------------|----------|
| 50% CD BID PACKAGE #3  | 08-28-09 |
| CONSTRUCTION DOCUMENTS | 09-30-09 |
| 100% CD                | 10-22-09 |
| ADDENDUM #2            | 12-09-09 |
| 3 ADDENDUM #3          | 12-30-09 |
| RECORD DRAWING         | 08-08-11 |
|                        |          |
|                        |          |
|                        |          |
|                        | ·        |

**REVISION HISTORY - THIS SHEET** 

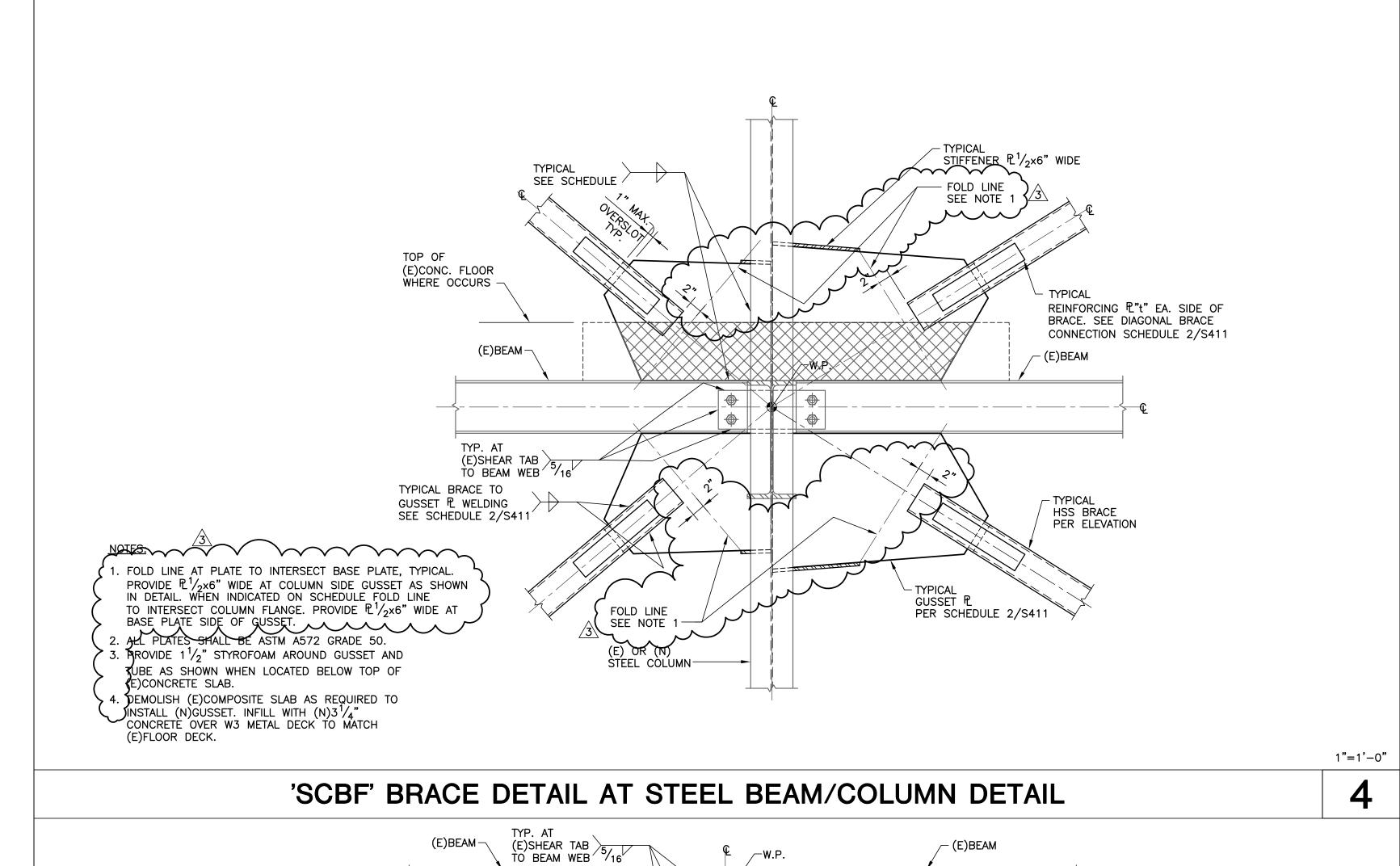


# **BUILDING 1 TYPICAL** SCBF FRAME DETAILS (SFRS)

|  |  | COMM. NO. | 3045-002-00    |  |  |  |
|--|--|-----------|----------------|--|--|--|
|  |  | SCALE     | AS NOTED       |  |  |  |
|  |  | DATE      | August 8, 2011 |  |  |  |
|  |  | DRAWN     | STAFF          |  |  |  |
|  |  |           |                |  |  |  |

RECORD DRAWING

TYPICAL SCBF HSS BRACE TO BEAM/STEEL COLUMN CONNECTION DETAIL



TYPICAL BRACE TO GUSSET PL WELDING

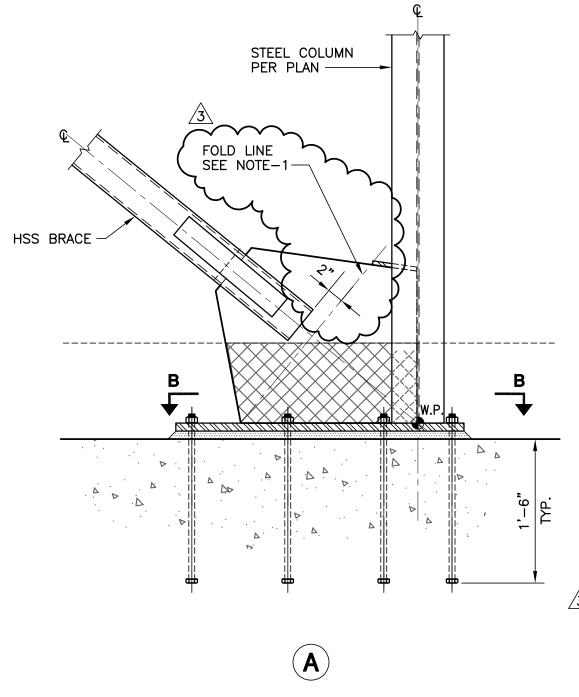
SEE SCHEDULE 2/S411

. FOLD LINE AT PLATE TO INTERSECT BEAM FLANGE, TYPICAL.

BEAM SIDE OF GUSSET.

2. ALL PLATES TO BE ASTM A572 (GRADE 50)

PROVIDE R1/2×6" WIDE AT COLUMN SIDE GUSSET AS SHOWN
IN DETAIL. WHEN INDICATED ON SCHEDULE FOLD LINE
TO INTERSECT COLUMN FLANGE. PROVIDE P1/2×8 WIDE AT



VARIES

SECTION B-B

(E)COLUMN — -TYP. C.P.
WELD LENGTH PER
GUSSET & SCHED. ALT. FILLET WELD SIZE AND LENGTH PER GUSSET PL SCHEDULE / SEE NOTE 7 (E)GUSSET PL AND BRACE WHERE OCCURS -TOP OF SLAB ON GRADE — ADD(2)#3 EA. SIDE— TOP OF (E)FTG-

 $\hat{3} \ / \hat{5}$  1. FOLD LINE AT PLATE TO INTERSECT BASE PLATE, TYPICAL. PROVIDE PL1/2×6" WIDE AT COLUMN SIDE GUSSET AS SHOWN
IN DETAIL. WHEN INDICATED ON SCHEDULE FOLD LINE
TO INTERSECT COLUMN FLANGE. PROVIDE PL1/2×6" WIDE AT
BASE PLATE SIDE OF GUSSET. 2. PROVIDE  $1\frac{1}{2}$ " STYROFOAM AROUND GUSSET AND TUBE AS SHOWN WHEN LOCATED BELOW SLAB ON GRADE.

INDICATED IN THE GUSSET PL SCHEDULE. ALTERNATIVELY, A DOUBLE— SIDED FILLET WELD MAY BE USED TO REPLACE COMPLETE PENETRATION WELD IF PROPER ACCESS IS PERMITTED BY THE EXISTING CONDITION TO PERFORM SUCH WELDING. 4. HOLES FOR ANCHOR BOLTS IN COLUMN BASE  $^{1}$  SHALL BE  $^{1}/_{8}$  OVERSIZE. 5. DEMOLISH (E)SLAB ON GRADE AS REQUIRED TO INSTALL (N)BASE PLATE AS

3. ALL PLATES TO BE ASTM A572 (GRADE 50), U.N.O. SHOWN. INFILL WITH (N)CONCRETE SLAB w/f'c=3000psi 6. ALL PLATES TO BE ASTM A572 (GRADE 50)

3

HSS BRACE PER ELEVATION

REINFORCING PL"t" EA. SIDE OF BRACE. SEE DIAGONAL

PER TYP. DIAGONAL BRACE CONNECTION SCHEDULE 2/S411

BRACE CONNECTION

SCHEDULE 2/S411

GUSSET PL

— FOLD LINE SEE NOTE 1

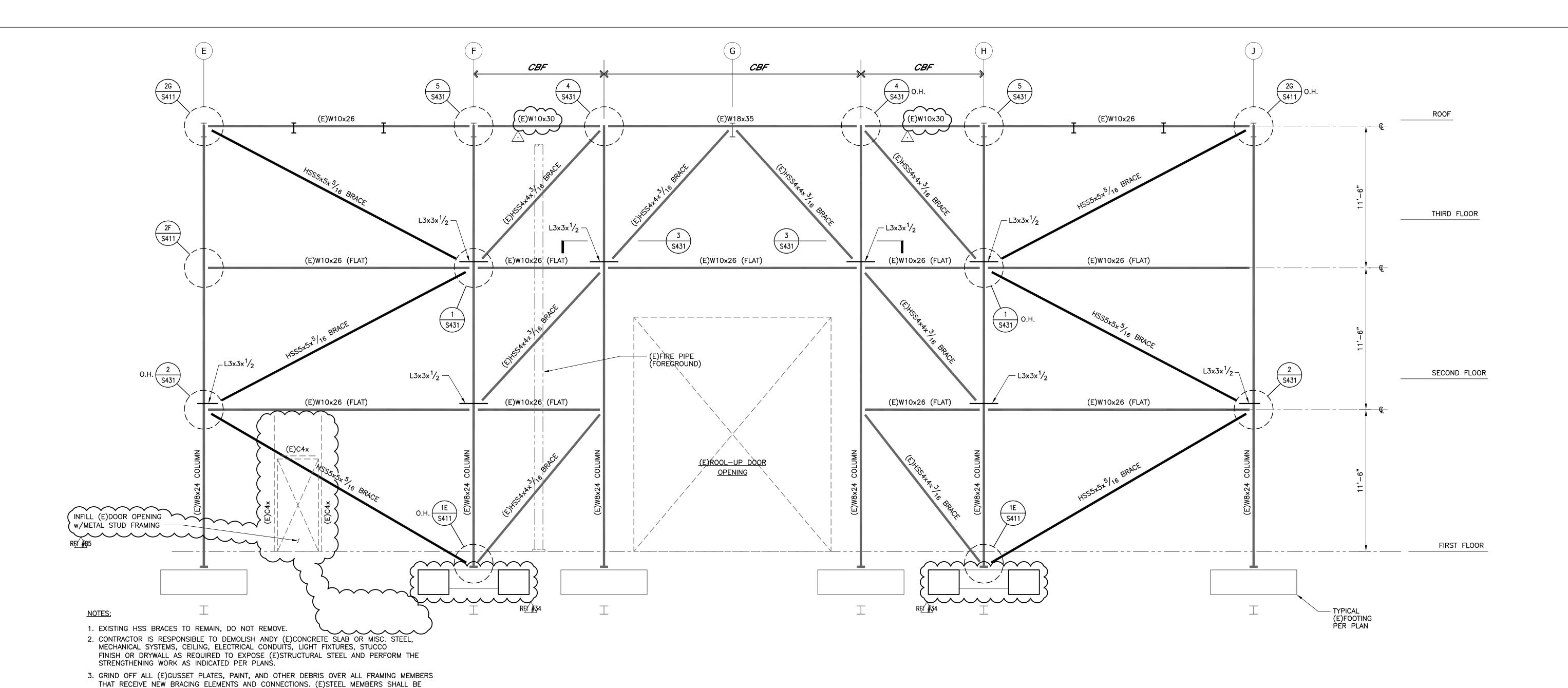
3. FOR GUSSET TO BEAM AND COLUMN WELD, SEE GUSSET

THE BRACE AS SHOWN ON BRACE ELEVATION.

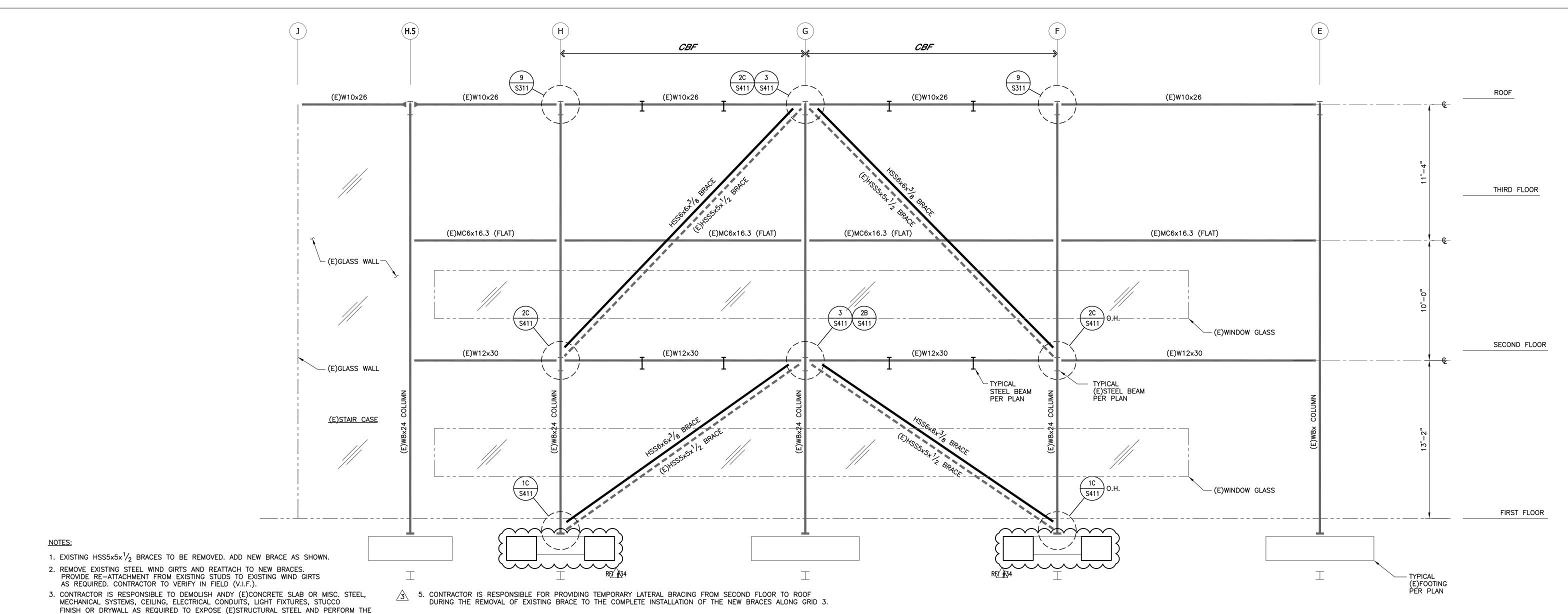
'SCBF' BRACE DETAIL AT STEEL BEAM DETAIL

PLATE SCHEDULE REFERENCED AT THE OPPOSITE END OF

TYPICAL 'SCBF' DIAGONAL BRACE AT STEEL COLUMN BASE DETAIL



SOUTH FRAME ELEVATION AT GRID 8



LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808 CLIENT PROJECT NAME: LONG BEACH CITY COLLEGE BUILDING " O " RECORD DRAWING

3045-002-00

CLIENT PROJECT NUMBER:

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640 (626) 793-7847 (310) 842-8700

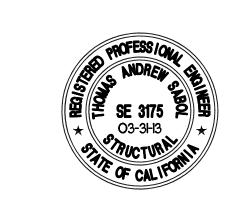
(310) 782-0850

 $\frac{1}{4}$ "=1'-0'

B

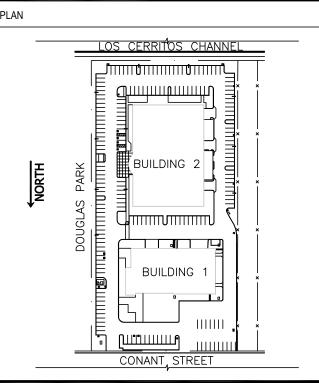
 $\frac{1}{4}$ "=1'-0"

Schirmer Engineering

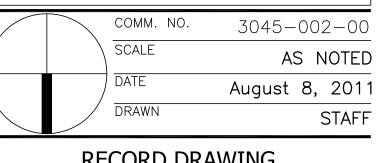


| ∑ 50% CD BID PACKAGE #3 | 08-28-09 |
|-------------------------|----------|
| CONSTRUCTION DOCUMENTS  | 09-30-09 |
| 100% CD                 | 10-22-09 |
| ADDENDUM #2             | 12-09-09 |
| 3 ADDENDUM #3           | 12-30-09 |
| RECORD DRAWING          | 08-08-11 |
|                         |          |
|                         |          |
|                         |          |
| $\overline{\ \ }$       |          |

**REVISION HISTORY - THIS SHEET** 



**BUILDING 1** FRAME ELEVATION (SFRS)



RECORD DRAWING

NORTH FRAME ELEVATION AT GRID 3

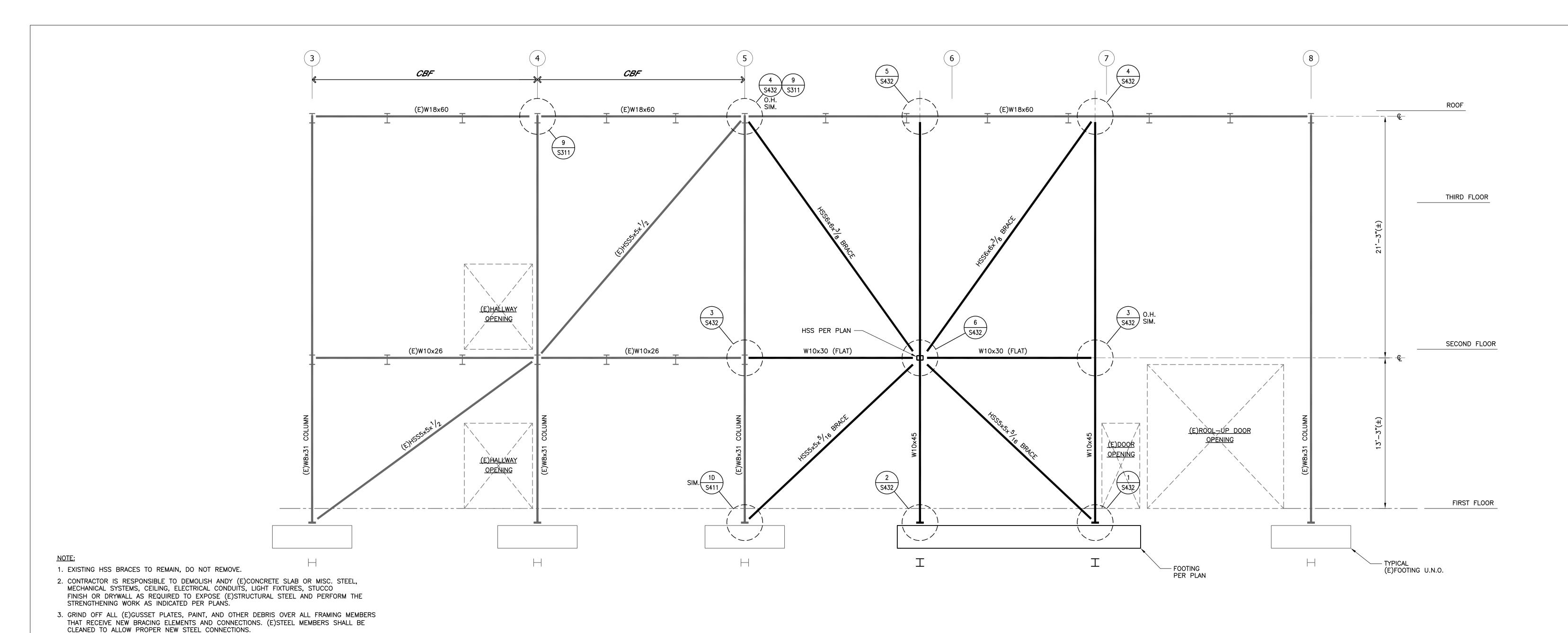
STRENGTHENING WORK AS INDICATED PER PLANS.

CLEANED TO ALLOW PROPER NEW STEEL CONNECTIONS.

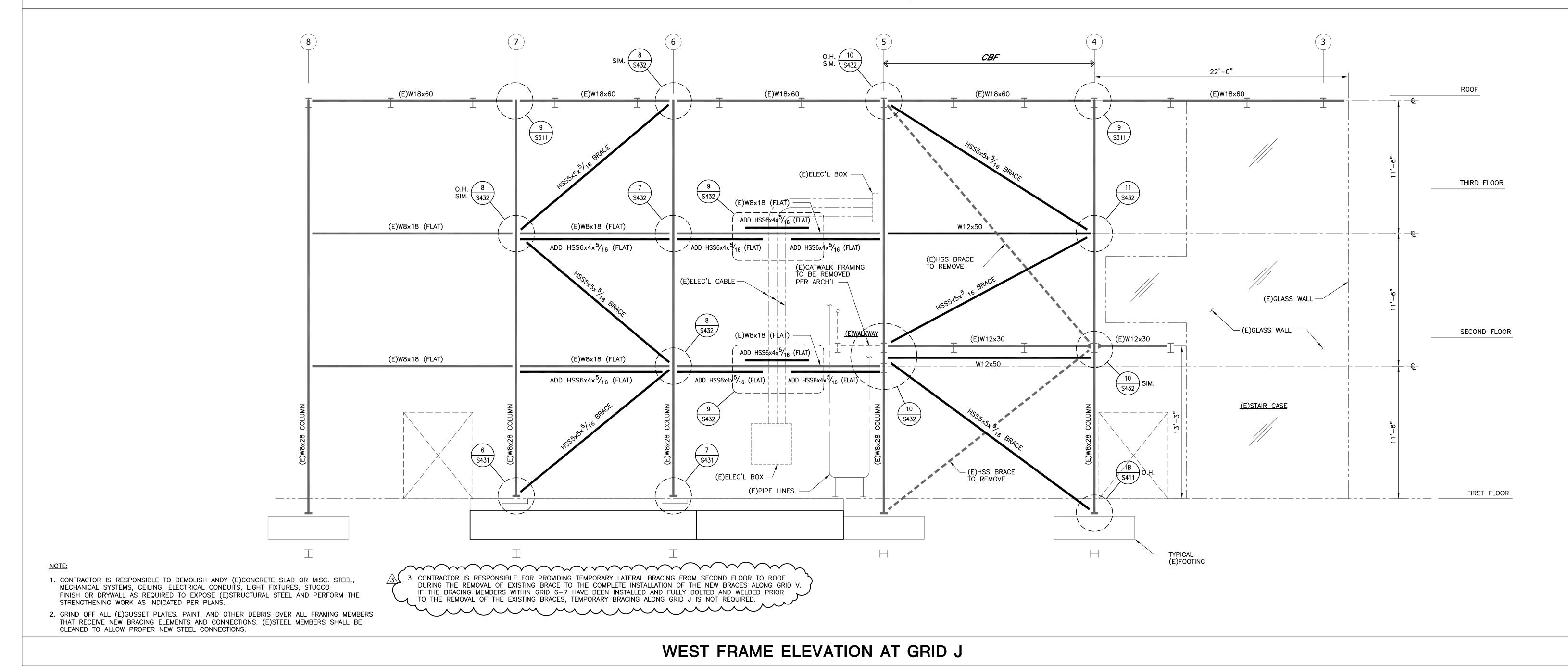
4. GRIND OFF ALL (E)GUSSET PLATES, PAINT, AND OTHER DEBRIS OVER ALL FRAMING MEMBERS

THAT RECEIVE NEW BRACING ELEMENTS AND CONNECTIONS. (E)STEEL MEMBERS SHALL BE

CLEANED TO ALLOW PROPER NEW STEEL CONNECTIONS.



EAST FRAME ELEVATION AT GRID E



CLIENT: LONG BEACH CITY COLLEGE

> 4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808 CLIENT PROJECT NAME: LONG BEACH CITY COLLEGE BUILDING " O " RECORD DRAWING

CLIENT PROJECT NUMBER: 3045-002-00

> Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640 (626) 793-7847 (310) 842-8700

(626) 793-7847

(310) 782-0850

 $\frac{1}{4}$ "=1'-0'

B

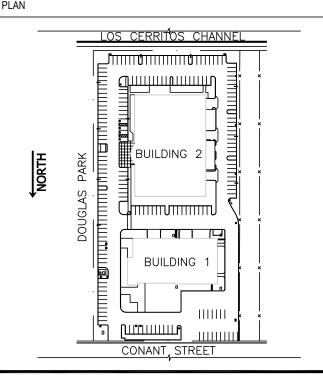
 $\frac{1}{4}$ "=1'-0"

Schirmer Engineering



| 50% CD BID PACKAGE #3  | 08-28-09 |
|------------------------|----------|
| CONSTRUCTION DOCUMENTS | 09-30-09 |
| 100% CD                | 10-22-09 |
| 2 ADDENDUM #2          | 12-09-09 |
| 3 ADDENDUM #3          | 12-30-09 |
| RECORD DRAWING         | 08-08-11 |
|                        |          |
|                        |          |
|                        |          |

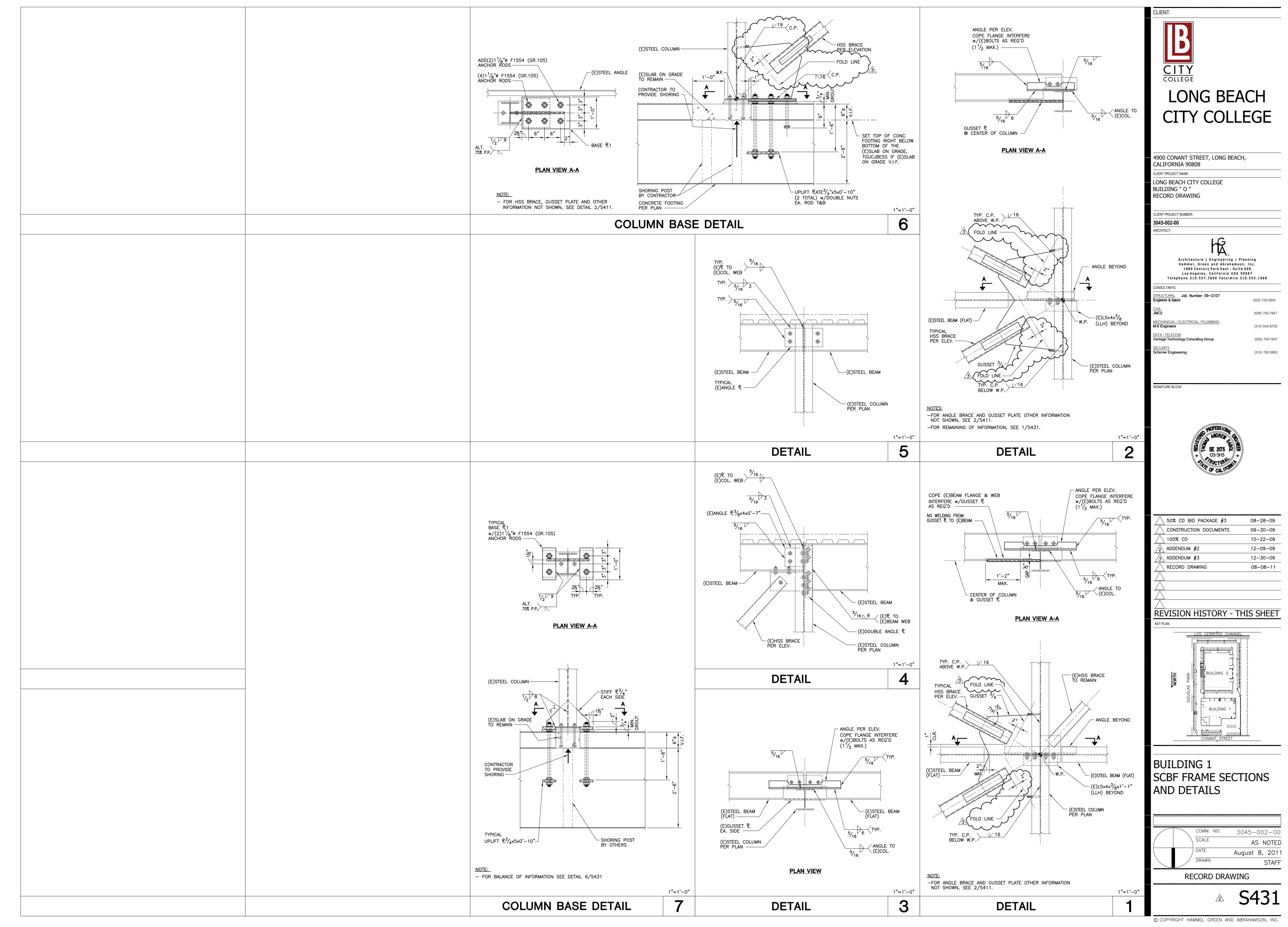
**REVISION HISTORY - THIS SHEET** 



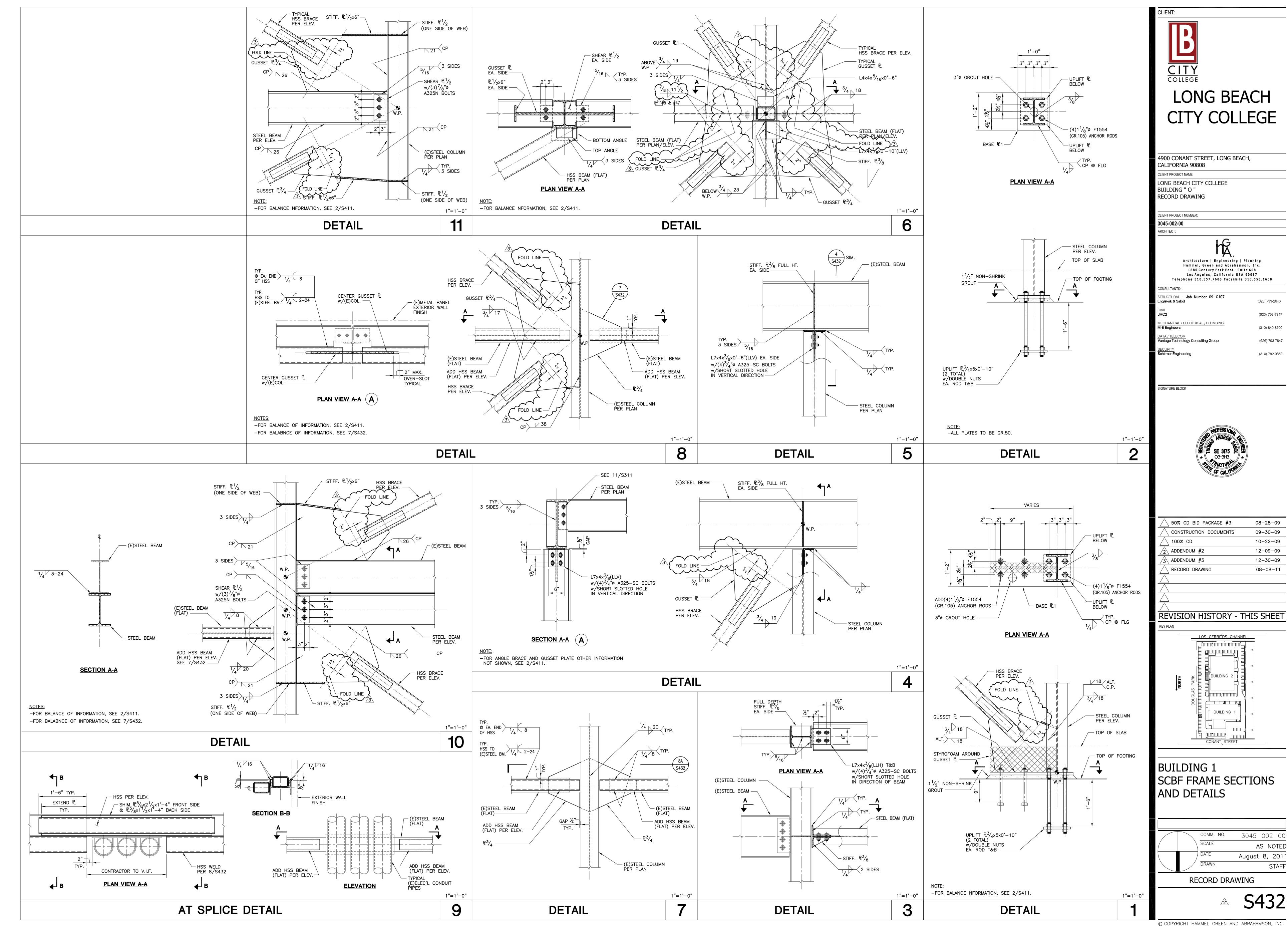
**BUILDING 1** FRAME ELEVATION (SFRS)

|   |    | сомм. | NO. | 3045-002-00    |
|---|----|-------|-----|----------------|
| / |    | SCALE |     | AS NOTED       |
|   |    | DATE  |     | August 8, 2011 |
|   |    | DRAWN |     | STAFF          |
|   | RF | CORD  | DF  | RAWING         |

KLCOKD DKAWING



PLOT OK
W:\Projects\09G107\S431.dwg, 8/2/2011 2:57:54 PM, Bluebeam PDF8 Printer HighRes.pc3



|           | DRAWING LIST                                          | M                                              | ECHANI          | CAL SYMBOLS                                   |
|-----------|-------------------------------------------------------|------------------------------------------------|-----------------|-----------------------------------------------|
| SHEET NO. | SHEET TITLE                                           | SYMBOL                                         | ABBREV.         | DESCRIPTION                                   |
| M010      | SYMBOLS, ABBREVIATIONS & DRAWING LIST                 | <u> </u>                                       |                 | ELBOW UP                                      |
| M011      | GENERAL NOTES                                         | 0                                              |                 | ELBOW UP AND DOWN                             |
| M012      | SCHEDULES                                             | G                                              |                 | ELBOW DOWN                                    |
| M013      | SCHEDULES                                             | <del></del>                                    |                 | TEE UP AND DOWN                               |
|           |                                                       | <del></del>                                    |                 | TEE DOWN                                      |
| M101A     | BUILDING 1 - MECHANICAL FIRST FLOOR DEMOLITION PLAN   | <del></del>                                    |                 | STRAINER                                      |
| M102A     | BUILDING 1 - MECHANICAL SECOND FLOOR DEMOLITION PLAN  | ——————————————————————————————————————         |                 | UNION                                         |
| M104A     | BUILDING 1 — MECHANICAL ROOF DEMOLITION PLAN          | <del></del>                                    |                 | FLANGE                                        |
| M105A     | BUILDING 1 — ENLARGED MECHANICAL ROOF DEMOLITION PLAN | <u> </u>                                       |                 | ECCENTRIC REDUCER                             |
| M101B     | BUILDING 2 — MECHANICAL FIRST FLOOR DEMOLITION PLAN   | <del></del>                                    |                 | CONCENTRIC REDUCER                            |
| M103B     | BUILDING 2 — MECHANICAL ROOF DEMOLITION PLAN          | EJ                                             |                 | EXPANSION / SEISMIC JOINT                     |
|           |                                                       | <u> </u>                                       |                 | PRESSURE GAGE WITH COCK                       |
| M201A     | BUILDING 1 — MECHANICAL FIRST FLOOR PLAN              | <u> </u>                                       |                 | THERMOMETER                                   |
|           | BUILDING 1 — MECHANICAL SECOND FLOOR PLAN             | <u> </u>                                       | PTTP            | PRESSURE AND TEMPERATURE                      |
|           |                                                       |                                                | 1 111           | TEST PLUG                                     |
|           | BUILDING 1 — MECHANICAL ROOF PLAN                     | <b>  *****</b>                                 |                 | FLEXIBLE PIPE CONNECTOR                       |
|           | BUILDING 1 — MECHANICAL ROOF ENLARGED PLAN            |                                                |                 | BUTTERFLY VALVE                               |
| M201B     | BUILDING 2 — MECHANICAL FIRST FLOOR PLAN              |                                                |                 | BALL VALVE                                    |
| M202B     | BUILDING 2 — MECHANICAL SECOND FLOOR PLAN             |                                                | GV              | GATE VALVE WITH INDICATION OF                 |
| M203B     | BUILDING 2 — MECHANICAL ROOF PLAN                     |                                                | CHV             | CHECK VALVE WITH INDICATION OF FLOW DIRECTION |
|           |                                                       | <b>───────</b>                                 |                 | GATE VALVE WITH HOSE CONNECTOR                |
| М300      | DETAILS                                               | <u></u>                                        | RV              | SAFETY OR PRESSURE RELIEF VALVE               |
| M301      | DETAILS                                               | <u>N</u>                                       | PRV             | PRESSURE REDUCING VALVE                       |
|           |                                                       | ——————————————————————————————————————         |                 | 2-WAY TEMPERATURE<br>CONTROL VALVE            |
| M500      | FLOW DIAGRAMS AND SECTIONS                            | ——————————————————————————————————————         |                 | 3-WAY TEMPERATURE<br>CONTROL VALVE            |
|           |                                                       | <del>[</del>                                   |                 | BALANCING VALVE (CIRCUIT SETTER)              |
| M600      | CONTROL DIAGRAMS                                      |                                                |                 | FLOW LIMITING VALVE. ("GRISWOLD" OR EQUAL)    |
| M601      | CONTROL SEQUENCE                                      | <u> </u>                                       | AAV             | AUTOMATIC AIR VENT                            |
|           |                                                       | <b>本</b> 案                                     | MAV             | MANUAL AIR VENT                               |
|           | REFERENCE DRAWING                                     | ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐          | FS              | FLOOR SINK<br>(UNDER PLUMBING SECTION)        |
| M4.1      | DDC POINTS LIST & SEQUENCE OF OPERATION               | •                                              | POC             | POINT OF CONNECTION                           |
|           | (BY P2S ENGINEERING DATED 02-07-01)                   |                                                | POD             | POINT OF DISCONNECTION                        |
|           |                                                       | (1) (1)                                        |                 | KEY NOTE                                      |
|           |                                                       |                                                |                 | DETAIL DESIGNATION DETAIL                     |
|           |                                                       | MI                                             |                 | SHEET NUMBER REFERENCE SECTION NO.            |
|           |                                                       | M 1M 2                                         |                 | SHEET NO. WHERE SECTION DRAWN                 |
|           |                                                       |                                                |                 | SHEET NO. WHERE SECTION TAKEN                 |
|           |                                                       | (1)                                            | 4.2             | REVISION TAG                                  |
|           |                                                       | $(N) \stackrel{\overline{AC}}{\underbrace{1}}$ | (N) <u>AC-1</u> | NEW EQUIPMENT DESIGNATION                     |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |
|           |                                                       |                                                |                 |                                               |

| SYM<br>DOUBLE      | BOL<br>SINGLE               | ABBREV. | DESCRIPTION                                                                                                                               |
|--------------------|-----------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------|
| JOORLE             | —SA—                        | SA      | SUPPLY AIR DUCT                                                                                                                           |
| <u> </u>           | —RA                         | RA      | RETURN AIR DUCT                                                                                                                           |
|                    | ——EA——                      | EA      | EXHAUST AIR DUCT                                                                                                                          |
|                    | —                           | RFA     | RELIEF AIR DUCT                                                                                                                           |
| (1L)               | (1L)                        | 14174   | DUCT WITH INTERNAL LINING                                                                                                                 |
|                    |                             |         | 1L= 1" THICK 2L= 2" THICK  TRANSITION - RECTANGULAR TO                                                                                    |
|                    |                             |         | RECTANGULAR OR ROUND TO ROUND  TRANSITION — RECTANGULAR TO                                                                                |
|                    |                             |         | ROUND VALUE TURNING MANES                                                                                                                 |
|                    |                             |         | ELBOW WITH TURNING VANES                                                                                                                  |
| <u>R</u>   }       | D                           |         | RISE IN DIRECTION OF AIRFLOW                                                                                                              |
| <u>D</u> .         | -                           |         | DROP IN DIRECTION OF AIRFLOW                                                                                                              |
|                    | <del></del>                 |         | DUCT DROP  COMBINATION FIRE & SMOKE DAMPER.                                                                                               |
|                    | <u> </u>                    | FSD     | COMBINATION FIRE & SMOKE DAMPER. CONTROLLED BY DUCT SMOKE DETECTOR. (NOT SHOWN ON PLAN)                                                   |
|                    | <u> </u>                    | FD      | FIRE DAMPER                                                                                                                               |
|                    | <del>     </del>            | MD      | MOTORIZED DAMPER                                                                                                                          |
|                    |                             | MVD     | MANUAL VOLUME DAMPER                                                                                                                      |
| 0                  | 9                           | BD      | BACKDRAFT DAMPER                                                                                                                          |
| \$                 | <u>X</u>                    |         | FLEXIBLE DUCT CONNECTOR                                                                                                                   |
|                    | 3                           |         | CAPPED DUCTWORK                                                                                                                           |
|                    | }                           |         | EXISTING DUCTWORK                                                                                                                         |
|                    | \$- <b>}-</b> }- <b>}</b> - |         | EXISTING DUCTWORK TO BE REMOVED                                                                                                           |
| 垃                  | <b>├</b> F→                 |         | CONICAL TAP W/ MANUAL VOLUME DAMPER                                                                                                       |
|                    | <b>-</b>                    |         | CONICAL TAP                                                                                                                               |
|                    | <b> </b>                    |         | FLEXIBLE DUCT                                                                                                                             |
|                    |                             |         | EXISTING CEILING ELECTRIC RADIANT PANEL TO BE REMOVED                                                                                     |
| -                  | CD-1<br>150S                |         | CEILING SUPPLY AIR DIFFUSER.  TYPE CD-1, 150CFM SUPPLY                                                                                    |
|                    | CG−1                        |         | CEILING RETURN AIR GRILLE. TYPE CG-1, 150CFM RETURN (T=TRANSFER)                                                                          |
|                    | ☐ 150R(T)<br>CG=1           |         | CEILING EXHAUST AIR GRILLE. TYPE CG-1, 150CFM EXHAUST                                                                                     |
| <u> </u>           | <sup>→</sup> 150E           |         | CEILING AIR GRILLE WITH RETURN AIR BOOT                                                                                                   |
|                    | ₩R-1                        |         | SIDEWALL SUPPLY AIR REGISTER.                                                                                                             |
| <u>'</u>           | 150S<br>WG-1                |         | TYPE WR-1, 150CFM SUPPLY  SIDEWALL RETURN AIR GRILLE. TYPE WG-1,                                                                          |
|                    | 150R(T)<br>WG-1             |         | 150CFM RETURN (T=TRANSFER)  SIDEWALL EXHAUST AIR GRILLE.                                                                                  |
|                    | 150E<br>Th                  |         | TYPE WG-1, 150CFM EXHAUST  AIR TERMINAL UNIT, SINGLE DUCT  (WITH HOT WATER REHEAT COIL AND  CONTROL PANEL LOCATION SHOWN)                 |
|                    |                             |         | CONTROL PANEL LOCATION SHOWN)  AIR TERMINAL UNIT WITH HOT WATER REHEAT AND LINED DISCHARGE AIR PLENUM (WITH CONTROL PANEL LOCATION SHOWN) |
|                    |                             |         | RETURN/EXHAUST AIR                                                                                                                        |
| (F)                |                             |         | FLOW DIRECTION                                                                                                                            |
| (T)                | _                           |         | SPACE TEMPERATURE SENSOR                                                                                                                  |
| (H:                |                             |         | SPACE HUMIDITY SENSOR                                                                                                                     |
| <u>(e</u> :        |                             |         | SPACE PRESSURE SENSOR  DUCT MOUNTED SMOKE DETECTOR                                                                                        |
| <u> </u>           |                             |         | (UNDER ELECTRICAL SECTION)  REMOTE MANUAL VOLUME                                                                                          |
| <u> </u>           |                             |         | DAMPER REGULATOR  WALL LOUVER                                                                                                             |
| W                  |                             |         | (UNDER ARCH SECTION)  UNDERCUT DOOR                                                                                                       |
|                    | ′C <b>→</b>                 |         | (UNDER ARCH SECTION)  DOOR LOUVER                                                                                                         |
| —D/                | <b>′L→</b>                  |         | (UNDER ARCH SECTION)                                                                                                                      |
|                    |                             | AP      | CEILING ACCESS PANEL                                                                                                                      |
| —— НV              | vs <del></del>              | HWS     | HOT WATER SUPPLY                                                                                                                          |
| —— ни              | VR ——                       | HWR     | HOT WATER RETURN                                                                                                                          |
| CI                 | D —                         | CD      | CONDENSATE DRAIN                                                                                                                          |
| <u> </u>           | CD ——                       | SCD     | SECONDARY CONDENSATE DRAIN                                                                                                                |
|                    |                             |         | EXISTING PIPE TO REMAIN                                                                                                                   |
| <del>/ / / /</del> | <del>/ / / /</del>          |         | EXISTING PIPE TO BE REMOVED                                                                                                               |
|                    |                             |         | PIPE TRANSITION                                                                                                                           |
|                    | ·3                          |         | CAPPED PIPE                                                                                                                               |
| ₽G                 |                             |         | TAP WITH SHUT OFF VALVE                                                                                                                   |

|         | ABBREVIATIONS                       |                     | ABBREVIATIONS                 |
|---------|-------------------------------------|---------------------|-------------------------------|
| ABBREV. | DESCRIPTION                         | ABBREV.             | DESCRIPTION                   |
| MOCP    | MAX. OVER CURRENT PROTECTION        | AFF                 | ABOVE FINISHED FLOOR          |
| MTL     | METAL                               | AMB.                | AMBIENT                       |
| (N)     | NEW                                 | AP                  | ACCESS PANEL                  |
| NC      | NOISE CRITERIA                      | В                   | BOILER                        |
| OA      | OUTSIDE AIR                         | BAS                 | BUILDING AUTOMATION SYSTEM    |
| O.C.    | ON CENTER                           | BTUH                | BRITISH THERMAL UNIT PER HOUR |
| OPNG    | OPENING                             | CAV                 | CONSTANT AIR VOLUME           |
| Р       | PUMP                                | CC                  | COOLING COIL                  |
| P.D.    | PRESSURE DROP/DIFFERENTIAL          | CFH                 | CUBIC FEET PER HOUR           |
| PF      | PRE-FILTER                          | CFM                 | CUBIC FEET PER MINUTE         |
| PRESS   | PRESSURE                            | COP                 | COEFFICIENT OF PERFORMANCE    |
| PSIG    | POUNDS PER SQUARE INCH GAUGE        | CV                  | CONSTANT VOLUME               |
| PWL     | SOUND POWER LEVEL                   | dB                  | DECIBEL                       |
| QTY.    | QUANTITY                            | DB                  | DRY-BULB                      |
| RA      | RETURN AIR                          | DDC                 | DIRECT DIGITAL CONTROL        |
| REF     | REFERENCE                           | DEFL                | DEFLECTION                    |
| RF      | RETURN FAN                          | DIA                 | DIAMETER                      |
| RFA     | RELIEF AIR                          | DN                  | DOWN                          |
| RH      | RELATIVE HUMIDITY                   | DP                  | DISCHARGE PLENUM              |
| (R/L)   | RELOCATED                           | DWG                 | DRAWING                       |
| RLA     | RUNNING LOAD AMP                    | (E)                 | EXISTING                      |
| RPM     | REVOLUTION PER MINUTE               | EA                  | EXHAUST AIR                   |
|         |                                     |                     |                               |
| RQD     | REQUIRED                            | EER                 | ENERGY EFFICIENT RATIO        |
| SA      | SUPPLY AIR  STANDARD AIR CUBIC FEET | EF EF               | EXHAUST FAN                   |
| SCFM    | PER MINUTE                          | EFF                 | EFFICIENCY                    |
| SF      | SUPPLY FAN                          | EJ                  | EXPANSION JOINT               |
| SHT     | SHEET                               | ENT                 | ENTERING                      |
| SJ      | SEISMIC JOINT                       | ESP                 | EXTERNAL STATIC PRESSURE      |
| SPECS   | SPECIFICATIONS                      |                     | DEGREE FAHRENHEIT             |
| S.P.    | STATIC PRESSURE                     | FF FF               | FINAL FILTER                  |
| SQ.     | SQUARE                              | FLA FLA             | FULL LOAD AMP.                |
| TG      | TRANSFER GRILLE                     | FPI FPI             | FINS PER INCH                 |
| TSP     | TOTAL STATIC PRESSURE               | FPM                 | FEET PER MINUTE               |
| TYP     | TYPICAL                             | FRIC.               | FRICTION                      |
| UON     | UNLESS OTHERWISE NOTED              | FS FS               | FLOOR SINK                    |
| UTR     | UP THROUGH ROOF                     | FT. W.C.            | FEET WATER COLUMN             |
| VAV     | VARIABLE AIR VOLUME                 | GAL                 | GALLON                        |
| VEL.    | VELOCITY                            | GPH                 | GALLONS PER HOUR              |
| VSD     | VARIABLE SPEED DRIVE                | GPM                 | GALLONS PER MINUTE            |
| VTR     | VENT THROUGH ROOF                   | GV                  | GRAVITY VENTILATOR            |
| WB      | WET-BULB                            | HC HC               | HEATING COIL                  |
| W/      | WITH                                | HP                  | HORSEPOWER                    |
| W/O     | WITHOUT                             | HZ                  | HERTZ                         |
|         |                                     | IN. W.C.            | INCH WATER COLUMN             |
|         |                                     | ISOL.               | ISOLATOR                      |
|         |                                     | KW                  | KILOWATTS                     |
|         |                                     | LBS                 | POUNDS                        |
|         |                                     | LVG.                | LEAVING                       |
| _       |                                     | MA                  | MAKE-UP AIR                   |
|         |                                     | MAX.                | MAXIMUM                       |
|         |                                     | MBH                 | THOUSAND BTUH                 |
|         |                                     | MCA                 | MINIMUM CIRCUIT AMPS          |
|         |                                     | MCC                 | MOTOR CONTROL CENTER          |
|         |                                     | <b>-</b>   <b> </b> |                               |



|    | 4900 CONANT STREET, LONG BEACH,<br>CALIFORNIA 90808         |
|----|-------------------------------------------------------------|
|    | CLIENT PROJECT NAME:                                        |
|    | LONG BEACH CITY COLLEGE<br>BUILDING " O "<br>RECORD DRAWING |
|    |                                                             |
|    | CLIENT PROJECT NUMBER:                                      |
| _\ | 3045-002-00                                                 |
|    | ADOLUTEOT                                                   |

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640 **(**310) 241-6550 (310) 842-8700 (310) 536-7676

(310) 782-0850

SIGNATURE BLOCK

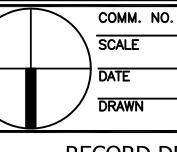
Schirmer Engineering

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY. ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

**REVISION HISTORY - THIS SHEET** 

SYMBOLS, ABBREVIATIONS
& DRAWING LIST



COMM. NO. 3045-002-00 August 8, 2011

RECORD DRAWING

M010

### **GENERAL NOTES (CONT.)**

- INSTALL DRAIN VALVES AT LOW POINTS OF SYSTEM TO ENABLE COMPLETE DRAINAGE AND AIR VENTS AT ALL HIGH POINTS.
- SLOPE HYDRAULIC PIPING FOR PROPER DRAINAGE AND ELIMINATION OF AIR.
- 5. PROVIDE CONDENSATE DRAIN PIPING WITH DRAINAGE FITTINGS FOR ALL COOLING COILS AND ROUTE TO
- PROVIDE PIPE SIZING PER "PIPE SIZE SCHEDULE", UNLESS OTHERWISE NOTED.
- PROVIDE COMPLETE ANALYSIS AND DESIGN OF PIPE HANGERS AND SUPPORTS BASED ON THE FINAL PLACEMENT OF PIPING SYSTEM. PROVIDE AND PLACE PIPE HANGERS AND SUPPORTS ACCORDINGLY IN ORDER TO PROPERLY SUPPORT THE PIPING SYSTEM.

### **GENERAL SEISMIC NOTES**

- CONTRACTOR TO PROVIDE COMPLETE SEISMIC ANCHORAGE AND BRACING FOR ALL MECHANICAL EQUIPMENT THAT IS DIRECTLY MOUNTED ON THE FLOOR OR ROOF AND ALL MECHANICAL EQUIPMENT THAT IS SUSPENDED FROM THE FLOOR, WALL OR SUPPORTED BY VIBRATION ISOLATORS TO RESIST A HORIZONTAL FORCE ACTING IN ANY DIRECTION USING THE CRITERIA OUTLINED IN THE 2007 CALIFORNIA BUILDING CODE. REFER TO CBC CHAPTER 16 FOR APPLICABLE VALUES AND FORCE FACTOR "AD" AND "Ro". PROVIDE ANCHORAGE CALCULATIONS AND DETAILS CERTIFIED BY A STRUCTURAL ENGINEER THE STATE OF CALIFORNIA. THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER AND THE AUTHORITIES HAVING JURISDICTION
- CONTRACTOR TO PROVIDE COMPLETE SEISMIC BRACING AND ANCHORAGE OF ALL PIPING AND DUCTWORK BOTH INSIDE THE BUILDING AND ON THE ROOF. BRACING AND ANCHORAGE SHALL CONFORM TO MASON INDUSTRIES NO. R-0349 "SEISMIC RESTRAINT GUIDELINES FOR SUSPENDED PIPING, DUCTWORK AND ELECTRICAL SYSTEMS". SMACNA R-0010 "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS", OR OTHER PRE-APPROVED SYSTEMS
- ALL PIPING, DUCTWORK AND CONDUIT CROSSING BUILDING SEISMIC SEPARATIONS SHALL BE PROVIDED WITH APPROVED FLEXIBLE CONNECTORS.
- REFER TO SPECIFICATION SECTION 15241 FOR ADDITIONAL REQUIREMENTS.

### SPECIAL NOTES

VERIFY THE SIZE AND LOCATION OF EXISTING DUCTWORK AND PIPING RELATED TO THE PROJECT PRIOR TO DEMOLITION, CONNECTION OR EXTENSION. THE DRAWINGS SHOW DIAGRAMMATICALLY THE APPROXIMATE LOCATION OF SOME OF THE DUCTWORK AND PIPING WHERE INFORMATION IS AVAILABLE, BUT THE DRAWINGS DO NOT SHOW EXACT QUANTITY, EXTENT OR LOCATION. EXERCISE EXTREME CAUTION TO LOCATE, IDENTIFY AND PROTECT EXISTING DUCTWORK AND PIPING THAT ARE TO REMAIN

## **EXISTING DUCTWORK PRESSURE TEST NOTES**

ALL EXISTING DUCTWORK (SUPPLY, RETURN, AND EXHAUST) TO REMAIN AS SHOWN ON DEMOLITION PLANS M101A, M102A, AND M105A SHALL RECEIVE DUCT PRESSURE/LEAK TEST. (TEST PRESSURE SHALL BE 4" W.C. FOR SUPPLY DUCT AND 2" W.C. FOR RETURN AND EXHAUST DUCTS) TEST SHALL FOLLOW THE REQUIREMENTS SET FORTH IN SPECIFICATION SECTION 15990-3.4, AND BE DONE WITHIN 3 WEEKS OF START OF THE CONSTRUCTION. SUBMIT TEST REPORT FOR REVIEW. THE REPORT SHALL IDENTIFY, CLEARLY, THE LOCATION OF ANY DEFICIENCIES.

### EXISTING DUCTWORK CLEANING AND SANITIZING NOTES

ALL EXISTING SUPPLY AND RETURN DUCTWORK TO REMAIN AS SHOWN ON DEMOLITION PLANS M101A. M102A, AND M105A SHALL BE CLEANED AND SANITIZED PER SPECIFICATION SECTION 15791 PRIOR TO CONNECTION TO NEW DUCTWORK.

## OWNER FURNISHED EQUIPMENT

LIEBERT COMPUTER ROOM AIR CONDITIONING UNITS, CRU-3 AND CRU-4, WITH OUTDOOR AIR-COOLED CONDENSING UNITS, ACC-3 AND ACC-4.

### **GENERAL NOTES**

### GENERAL:

- SCOPE OF WORK INCLUDES WORK SHOWN ON DRAWINGS, DESCRIBED IN THE SPECIFICATIONS, WHETHER SHOWN ON DRAWINGS OR NOT, AND ALL OTHER WORK REQUIRED FOR COMPLETE FUNCTIONAL SYSTEM. WORK SHOWN ON THE DRAWINGS IS ALL INCLUSIVE, WHETHER SHOWN AT ALL LOCATIONS OR NOT, AS
- SEAL OPENINGS AROUND PIPING AND DUCTWORK PENETRATING FIRE RESISTIVE RATED WALLS AND 2.
- CURBS, ROOF JACKS AND EQUIPMENT SUPPORT PADS SHALL BE COMPATIBLE WITH ROOFING SYSTEM. REFERENCE ARCHITECTURAL DRAWINGS FOR REQUIRED FLASHING DETAILS.
- INSTALL EQUIPMENT IN ACCESSIBLE LOCATION AND PROVIDE ADEQUATE SERVICE CLEARANCE FOR NORMAL MAINTENANCE WITHOUT REQUIRING REMOVAL OF ARCHITECTURAL, ELECTRICAL OR STRUCTURAL
- FOR EQUIPMENT LOCATED ABOVE CEILING, INSTALL SUCH EQUIPMENT CLOSE ENOUGH TO THE CEILING ELEVATION TO FACILITATE READILY ACCESS FOR MAINTENANCE AND SERVICING.
- COORDINATE EXACT LOCATION OF CORE DRILLING, CUTTING OF FLOOR SLAB, OR WALLS OF THE BUILDING WITH THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
- CUTTING, BORING, SAW CUTTING OR DRILLING THROUGH NEW OR EXISTING STRUCTURAL ELEMENTS TO BE DONE ONLY WHEN SO DETAILED ON THE DRAWINGS OR ACCEPTED BY THE STRUCTURAL ENGINEER.
- COORDINATE TEMPERATURE SENSOR AND THERMOSTAT LOCATION WITH FLOOR PLANS AND ELEVATION WITH LIGHT SWITCH/FIRE ALARM DEVICES. TEMPERATURE SENSOR AND THERMOSTAT ELEVATION TO BE SAME ELEVATION AS LIGHT SWITCH/FIRE ALARM DEVICES AND PLACED NEAR A CORNER OF THE ROOM OR BY LIGHT SWITCHES. DO NOT INSTALL IN THE CENTER OF THE WALL
- LEGALLY DISPOSE OFF-SITE ALL EQUIPMENT, DUCTWORK, PIPING, ETC., IDENTIFIED AS BEING REMOVED.
- THESE DRAWINGS ARE DIAGRAMMATIC. ALL TURNS, BENDS, AND ELEVATION CHANGES ARE NOT SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY OF COORDINATION WITH VARIOUS TRADES AND INCLUDE ALL TURNS, BENDS, ADDITIONAL LENGTHS OF DUCTS, PIPING AND ELEVATION CHANGES, AND TRANSITIONS WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR MUST EXAMINE ALL CONSTRAINTS AND THE AVAILABLE SPACE AT THE SITE THAT MAY REQUIRE CUSTOM FABRICATION. DISASSEMBLY AND RE-ASSEMBLY OF CERTAIN EQUIPMENT AT THE FINAL LOCATION OF THE JOB SITE.
- MAINTAIN A MINIMUM OF 42 INCHES CLEAR IN FRONT OF ALL VARIABLE SPEED DRIVES.
- 13. THE CEILING SPACE IS USED AS A RETURN AIR PLENUM. ALL MATERIALS EXPOSED IN PLENUM SHALL COMPLY WITH APPLICABLE PORTIONS OF LAMC INCLUDING SECTIONS 601.4 AND 602.
- PENETRATIONS THROUGH FIRE RATED FLOORS AND WALLS SHALL BE PROTECTED IN ACCORDANCE WITH CBC SECTIONS 709.6 AND 710.2. SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS AND APPROVED LISTING. MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE PROVIDED FOR REVIEW BY INSPECTION AUTHORITIES.
- PROVIDE PERMANENT IDENTIFICATION ON THE EQUIPMENT TO INDICATE THE AREA OR SPACE SERVED

### DUCTWORK:

- PROVIDE MANUAL VOLUME DAMPERS ON RETURN AND EXHAUST DUCT BRANCHES, AND SUPPLY DUCT BRANCHES DOWNSTREAM OF THE AIR TERMINAL UNITS FOR PROPER BALANCING OF THE AIR DISTRIBUTION
- PROVIDE MANUAL VOLUME DAMPER REMOTE REGULATOR FOR THE MANUAL VOLUME DAMPER LOCATED ABOVE INACCESSIBLE CEILING AND AT THE LOCATION NOT READILY ACCESSIBLE. REFER TO SPECIFICATIONS FOR TYPE. OBTAIN APPROVAL FROM THE OWNER'S REPRESENTATIVE WHERE AN ACCESS DOOR/ PANEL IS SUBSTITUTED IN LIEU OF REMOTE REGULATOR
- DIMENSIONS OF ACOUSTICALLY LINED DUCTWORK AS SHOWN ON PLANS ARE CLEAR INSIDE DIMENSIONS. INCREASE SIZE OF DUCT BY THICKNESS OF ACOUSTICAL LINING.
- DUCT PRESSURE CLASS BETWEEN AIR HANDLING UNITS AND THE INLET TO AIR TERMINAL UNITS SHALL BE BASED ON THE TOTAL STATIC PRESSURE OF THE CORRESPONDING AIR HANDLING UNIT AND SUCH DUCTS (WHETHER EXISTING OR NEW) SHALL BE PRESSURE TESTED FOR LEAKS PER SMACNA STANDARDS BEFORE CONCEALING DUCTS AND BEFORE CONNECTING TO AIR TERMINAL UNITS. OTHER DUCTWORK LOCATED IN SHAFTS OR ENCLOSURES AND MEDIUM PRESSURE DUCTWORK SHALL ALSO BE PRESSURE TESTED PER REQUIREMENTS AS STATED IN THE SPECIFICATIONS. DAMPERS AND DUCT ACCESS DOORS SHALL BE INSTALLED PRIOR TO LEAK TEST.
- LOW PRESSURE FLEXIBLE DUCT LENGTH SHALL NOT EXCEED 7'-0" AND NOT LESS THAN 4'-0". USE OF FLEXIBLE DUCT AT INLET TO AIR TERMINAL UNITS IS NOT PERMITTED. MINIMUM RADIUS SHALL BE 1-1/2
- USE OF FLEXIBLE DUCT ABOVE INACCESSIBLE CEILING, IN EXPOSED AREA, AND IN TRANSFER AIR DUCT IS
- DUCT LOCATED UPSTREAM AND WHERE SUCH DUCT IS 10 FEET OR LESS BETWEEN THE AIR TERMINAL UNIT INLET AND THE MAIN DUCT SHALL BE SAME SIZE AS THE TERMINAL UNIT INLET. OTHERWISE, SIZE DUCT LOCATED UPSTREAM OF AIR TERMINAL UNIT PER "DUCT SIZE SCHEDULE" OR PER SIZE AS NOTED
- COORDINATE EXACT LOCATION OF ALL CEILING DIFFUSERS, REGISTERS AND GRILLES WITH LIGHTING LAYOUT, CEILING TILE PATTERN AND TYPE, AND CEILING CONSTRUCTION WITH ARCHITECTURAL REFLECTED
- COORDINATE WITH DIVISION 16 FOR LOCATION OF POWER AND LOCAL DISCONNECTS FOR COMBINATION FIRE/SMOKE DAMPERS.
- COORDINATE EXACT LOCATION OF CEILING, WALL, OR FLOOR ACCESS PANELS FOR ITEMS REQUIRING ACCESS SUCH AS AIR TERMINAL UNITS, FIRE DAMPERS, COMBINATION FIRE / SMOKE DAMPERS, VOLUME DAMPERS, VALVES, AND DEVICES REQUIRED ACCESS WITH ARCHITECTURAL DRAWINGS. PROVIDE REQUIRED ACCESS DOORS/PANELS FOR SERVICING LISTED ITEMS WHETHER OR NOT SUCH ACCESS IS SHOWN ON ARCHITECTURAL DRAWINGS
- NON-DUCTED RETURN AIR GRILLE FOR CEILING RETURN AIR PLENUM APPLICATION SHALL HAVE NECK SIZE BASED ON "TRANSFER AIR" COLUMN PER CORRESPONDING GRILLE SCHEDULE.
- AIR GRILLE FOR TRANSFER AIR FUNCTION SHALL HAVE NECK SIZE BASED ON "TRANSFER AIR" COLUMN PER CORRESPONDING GRILLE SCHEDULE.
- PROVIDE DUCT SIZING PER "DUCT SIZE SCHEDULE", UNLESS OTHERWISE NOTED.
- 14. PROVIDE CLEAR SPACE IN FRONT OF AIR TERMINAL UNIT CONTROLLER PER CODE REQUIREMENT. BUT NOT

- PROVIDE ISOLATING VALVES AND UNIONS ON PIPING ADJACENT TO CONTROL VALVES AND OTHER APPURTENANCES OR EQUIPMENT. LOCATE VALVES SO THE EQUIPMENT CAN BE REMOVED WITHOUT DISMANTLING ANY BRANCH LINES.
- INSTALL BALANCING, FLOW, CONTROL AND FLOW LIMITING VALVES WITH UPSTREAM AND DOWNSTREAM STRAIGHT PIPE LENGTHS PER MANUFACTURER'S RECOMMENDATIONS.



# LONG BEACH CITY COLLEGE

900 CONANT STREET, LONG BEACH,

CALIFORNIA 90808

ONG BEACH CITY COLLEGE

UILDING " O CORD DRAWING

45-002-00

HR. Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

RUCTURAL olekirk & Sabo

(310) 536-7676

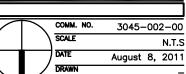
CONTRACTOR'S RECORDED CHANGES IAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY

ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

GENERAL NOTES



RECORD DRAWING

NOTES: 1) FURNISH WITH 2" SPRING ISOLATED PRE-FABRICATED ROOF CURB. (SIDE) SUPPLY AND RETURN AIR DUCT CONNECTIONS. (5) PROVIDE ADD ALTERNATE PRICING FOR CONDENSER COIL COATING.

| SIDE           | SIDEWALL SUPPLY REGISTER SCHEDULE, WR-1 (TITUS MODEL "300RL") |                  |           |                 |                            |     |                                                                                                                                                                                                                                               |  |         |
|----------------|---------------------------------------------------------------|------------------|-----------|-----------------|----------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------|
| NECK<br>SIZE 1 | CFM RANGE                                                     | MAX<br>STATIC PD | MAX<br>NC | M <i>A</i><br>5 | MAX THROW @<br>50 FPM (FT) |     | 50 FPM (FT)                                                                                                                                                                                                                                   |  | REMARKS |
| 3121           |                                                               | (IN W.C.)        |           | 0.              | 22.5°                      | 45° |                                                                                                                                                                                                                                               |  |         |
| 6" x 6"        | < 100                                                         | 0.10             | 20        | 18              | 14                         | 8   | A LINE FOR ATHERWISE MATER ON BRANCHIO                                                                                                                                                                                                        |  |         |
| 10" x 6"       | 101-180                                                       | 0.10             | 20        | 24              | 19                         | 11  | <ul> <li>UNLESS OTHERWISE NOTED ON DRAWINGS.</li> <li>ALL EQUALIZING GRIDS, DUCT SURFACES, AND OTHER ACCESSORIES AND VISIBLE THROUGH AIR OUTLETS SHALL BE FLAT BLACK FINISH.</li> <li>PROVIDE DUCT TO NECK TRANSITION AS REQUIRED.</li> </ul> |  |         |
| 14" x 6"       | 181-250                                                       | 0.10             | 20        | 28              | 22                         | 13  |                                                                                                                                                                                                                                               |  |         |
| 22" x 6"       | 251-370                                                       | 0.10             | 20        | 35              | 27                         | 16  |                                                                                                                                                                                                                                               |  |         |
| 18" x 12"      | 371-590                                                       | 0.10             | 20        | 44              | 34                         | 20  |                                                                                                                                                                                                                                               |  |         |
| 24" x 12"      | 591-750                                                       | 0.10             | 20        | 50              | 43                         | 25  |                                                                                                                                                                                                                                               |  |         |
| 24" x 14"      | 751-820                                                       | 0.10             | 20        | 54              | 42                         | 24  |                                                                                                                                                                                                                                               |  |         |

| SIDE             | WALL RE         | TURN/EXH                       | HAU;      | ST/TRAN   | ISFER GRILLE SCHEDULE, WG-1 (TITUS MODEL "350RL")                                                                             |
|------------------|-----------------|--------------------------------|-----------|-----------|-------------------------------------------------------------------------------------------------------------------------------|
| NEOK             | RE <sup>-</sup> | TURN/EXHAUST                   |           | TRANSFER  |                                                                                                                               |
| NECK<br>SIZE (1) | CFM RANGE       | MAX NEG STATIC<br>PD (IN W.C.) | MAX<br>NC | CFM RANGE | REMARKS                                                                                                                       |
| 6" x 6"          | < 100           | 0.10                           | 25        | ı         | A LINILEGE OTHERWISE NOTED ON DRAWINGS                                                                                        |
| 10" x 6"         | 101–180         | 0.10                           | 25        | < 65      | (1) UNLESS OTHERWISE NOTED ON DRAWINGS.                                                                                       |
| 14" x 6"         | 181-250         | 0.10                           | 25        | 66-95     | (2) ALL EQUALIZING GRIDS, DUCT SURFACES, AND OTHER ACCESSORIES AND VISIBLE THROUGH AIR<br>OUTLETS SHALL BE FLAT BLACK FINISH. |
| 22" x 6"         | 251-370         | 0.05                           | 25        | 96-150    | (3) PROVIDE DUCT TO NECK TRANSITION AS REQUIRED.                                                                              |
| 18" x 12"        | 371–590         | 0.05                           | 25        | 151-270   |                                                                                                                               |
| 24" x 12"        | 591-750         | 0.05                           | 25        | 271-360   |                                                                                                                               |
| 24" x 14"        | 751-820         | 0.05                           | 25        | 361-420   |                                                                                                                               |

|        | AIR   | TERI    | MINAL     | UNIT           | SCI  | HEDU         | JLE     | (SIN  | GLE [ | DUCT WITH REHEAT)                             |
|--------|-------|---------|-----------|----------------|------|--------------|---------|-------|-------|-----------------------------------------------|
|        |       | CFM     | RANGE     |                |      | REHE         | AT COIL |       |       |                                               |
| EQUIP. | SIZE  |         |           |                | А    | IR           |         | WATER |       | REMARKS                                       |
| NO.    | (IN.) | MAX.    | MIN.      | TOTAL<br>(MBH) | ENT. | LVG.<br>(°F) | GPM     | ENT.  | LVG.  |                                               |
| BUIL   | .DING | 1 - LEV | <br>'EL 1 |                |      |              |         |       |       |                                               |
| 1.01A  | 8     | 500     | 150       | 7.2            | 52   | 96           | 0.5     | 180   | 150   | _                                             |
| 1.02A  | 10    | 700     | 210       | 10.2           | 52   | 97           | 0.7     | 180   | 150   | _                                             |
| 1.03A  | 8     | 600     | 180       | 8.6            | 52   | 96           | 0.6     | 180   | 150   | _                                             |
| 1.04A  | 8     | 420     | 126       | 6.3            | 52   | 98           | 0.4     | 180   | 150   | PROVIDE WITH 3-WAY TEMPERATURE CONTROL VALVE. |
| 1.05A  | 10    | 620     | 186       | 8.7            | 52   | 95           | 0.6     | 180   | 150   | _                                             |
| 1.06A  | 10    | 860     | 258       | 11.3           | 52   | 93           | 0.8     | 180   | 150   | _                                             |
| 1.07A  | 6     | 300     | 90        | 3.8            | 52   | 91           | 0.3     | 180   | 150   | _                                             |
| 1.08A  | 8     | 400     | 120       | 5.8            | 52   | 97           | 0.4     | 180   | 150   | _                                             |
| 1.09A  | 8     | 480     | 144       | 6.1            | 52   | 91           | 0.4     | 180   | 150   | _                                             |
| 1.10A  | 8     | 600     | 180       | 7.6            | 52   | 91           | 0.5     | 180   | 150   | _                                             |
| 1.11A  | 8     | 450     | 135       | 6.0            | 52   | 93           | 0.4     | 180   | 150   | _                                             |
| 1.12A  | 12    | 1150    | 345       | 11.5           | 52   | 83           | 0.8     | 180   | 150   | _                                             |
| 1.13A  | 5     | 175     | 53        | 2.0            | 52   | 87           | 0.1     | 180   | 150   | PROVIDE WITH 3-WAY TEMPERATURE CONTROL VALVE. |
| BUIL   | DING  | 1 - LEV | EL 2      |                |      |              |         | _     |       |                                               |
| 2.01A  | 5     | 120     | 36        | 1.2            | 52   | 83           | 0.1     | 180   | 150   | _                                             |
| 2.02A  | 10    | 960     | 288       | 13.7           | 52   | 96           | 0.9     | 180   | 150   | _                                             |
| 2.03A  | 6     | 300     | 90        | 3.9            | 52   | 92           | 0.3     | 180   | 150   | _                                             |
| 2.04A  | 6     | 200     | 60        | 1.8            | 52   | 80           | 0.1     | 180   | 150   | _                                             |
| 2.05A  | 10    | 965     | 290       | 8.1            | 52   | 78           | 0.5     | 180   | 150   | _                                             |
| 2.06A  | 8     | 480     | 144       | 5.4            | 52   | 87           | 0.4     | 180   | 150   | <del>-</del>                                  |
| 2.07A  | 10    | 830     | 249       | 12.4           | 52   | 98           | 0.8     | 180   | 150   | _                                             |
| 2.08A  | 6     | 300     | 90        | 4.2            | 52   | 95           | 0.3     | 180   | 150   | _                                             |
| 2.09A  | 6     | 300     | 90        | 2.7            | 52   | 80           | 0.2     | 180   | 150   | _                                             |
| 2.10A  | 5     | 190     | 57        | 2.5            | 52   | 93           | 0.2     | 180   | 150   | _                                             |
| 2.11A  | 6     | 290     | 87        | 3.2            | 52   | 86           | 0.2     | 180   | 150   | _                                             |
| 2.12A  | 8     | 400     | 120       | 5.5            | 52   | 94           | 0.4     | 180   | 150   | PROVIDE WITH 3-WAY TEMPERATURE CONTROL VALVE. |
| 2.13A  | 5     | 135     | 41        | 1.3            | 52   | 81           | 0.1     | 180   | 150   | _                                             |
| 2.14A  | 8     | 500     | 150       | 7.3            | 52   | 97           | 0.5     | 180   | 150   | _                                             |
| 2.15A  | 8     | 375     | 113       | 9.5            | 52   | 128          | 0.6     | 180   | 150   | _                                             |
|        |       | 2 - LEV |           |                |      |              |         |       |       |                                               |
| 1.01B  | 10    | 720     | 216       | 4.7            | 52   | 72           | 0.3     | 180   | 150   | _                                             |
|        |       |         |           |                |      |              |         |       |       |                                               |
|        |       |         |           |                |      |              |         |       |       |                                               |
|        |       |         |           |                |      |              |         |       |       |                                               |

| CFM RANGE    | ROUND<br>DUCT     |        | RECTA  | ANGULAR DU | CT WIDTH, W | / (IN.) |         | REMARKS                                                                                                                                                             |
|--------------|-------------------|--------|--------|------------|-------------|---------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OF WE TO THE | DIAMETER<br>(IN.) | W × 4" | W x 6" | W x 8"     | W x 10"     | W x 12" | W x 14" |                                                                                                                                                                     |
| ≼ 65         | 6                 | _      | _      | _          | _           | _       | _       | 1. DUCT SIZES INDICATED ARE INSIDE DIMENSIONS. ASPECT RATIO MAY BE ALTERED TO SUIT                                                                                  |
| 66-160       | 7                 | 12     | 8      | _          | -           | _       | _       | OTHER DIMENSIONS FOR AVOIDING INTERFERENCES AND CLEARANCE REQUIREMENTS. USE EQUAL                                                                                   |
| 161-220      | 8                 | _      | 10     | 8          | _           | _       | _       | FRICTION METHOD TO ESTABLISH ALTERNATIVE DUCT SIZE.                                                                                                                 |
| 221-300      | 9                 | -      | 12     | 10         | -           | _       | _       | 2. VERIFY ALL DIMENSIONS AT THE SITE. MAKE ALL FIELD MEASUREMENTS AND SHOP DRAWINGS NECESSARY FOR FABRICATION AND ERECTION OF SHEET METAL WORK. MAKE ALLOWANCES FOR |
| 301-400      | 10                | -      | 16     | 12         | 10          | _       | _       | BEAMS, PIPE OR OTHER OBSTRUCTION AND FOR WORK BY OTHER TRADES AND NOTIFY THE OWNER'S REPRESENTATIVE IN THE EVENT OF ANY POTENTIAL INTERFERENCES. MAKE AN INITIAL    |
| 401-520      | 12                | _      | _      | 14         | 10          | _       | _       | VERIFICATION OF BEAM PENETRATIONS SHOWN ON STRUCTURAL DRAWINGS AND ADVISE OF ANY POTENTIAL INTERFERENCES.                                                           |
| 521-650      | 12                | -      | _      | 16         | 12          | _       | _       |                                                                                                                                                                     |
| 651-800      | 14                | _      | _      | 20         | 14          | 12      | _       | 3. FOR TRANSFER AND RELIEF AIR DUCTS, SIZE DUCT BASED ON 0.01 IN. FRICTION PER 100 FEET OF DUCT OR MAX. 300 FPM, WHICHEVER IS MORE STRINGENT.                       |
| 801-1000     | 14                | _      | _      | 22         | 16          | 14      | _       |                                                                                                                                                                     |
| 1001-1400    | 16                | -      | _      | _          | 22          | 18      | 16      |                                                                                                                                                                     |
| 1401-1700    | 18                | _      | -      | _          | 26          | 22      | 18      |                                                                                                                                                                     |
| 1701-1900    | 18                | _      | _      | _          | 30          | 24      | 20      |                                                                                                                                                                     |
| 1901-2200    | 20                | _      | _      | _          | _           | 26      | 22      |                                                                                                                                                                     |
| 2201-2500    | 20                | _      | _      | _          | _           | 28      | 24      |                                                                                                                                                                     |

| S            | INGLE DU                   | CT AIR        | TERMINA                 | L UNIT S     | CHEDUL               | E                      |         |                               |                        |
|--------------|----------------------------|---------------|-------------------------|--------------|----------------------|------------------------|---------|-------------------------------|------------------------|
| LINUT        | MANUICACTURER              | INILET        | TERMINAL UNIT<br>ONLY   | OFM          | NOISE CRI<br>MIN. △F | TERIA (NC)<br>PS=+1.0" | REHEA   | T COIL                        |                        |
| UNIT<br>SIZE | MANUFACTURER AND MODEL NO. | INLET<br>SIZE | MIN. P.D.<br>(IN. W.C.) | CFM<br>RANGE | DISCHARGE            | RADIATED               | SIZE    | AIR<br>MAX. P.D.<br>(IN W.C.) | REMARKS                |
| 5            | ENVIRO-TEC<br>SDR          | 5"ø           | 0.01                    | 100-200      | < 18                 | < 14                   | 10"X10" | 0.06                          | ELECTRICAL POWER: 120V |
| 6            | ENVIRO-TEC<br>SDR          | 6"ø           | 0.06                    | 201-350      | < 18                 | < 14                   | 10"X10" | 0.15                          | ELECTRICAL POWER: 120V |
| 8            | ENVIRO-TEC<br>SDR          | 8 <b>"</b> ø  | 0.04                    | 351-600      | < 15                 | < 15                   | 12"X10" | 0.31                          | ELECTRICAL POWER: 120V |
| 10           | ENVIRO-TEC<br>SDR          | 10"ø          | 0.04                    | 601-1000     | < 15                 | < 15                   | 14"X12" | 0.37                          | ELECTRICAL POWER: 120V |
| 12           | ENVIRO-TEC<br>SDR          | 12 <b>"</b> ø | 0.04                    | 1001-1400    | < 15                 | < 19                   | 16"X15" | 0.40                          | ELECTRICAL POWER: 120V |
| 14           | ENVIRO-TEC<br>SDR          | 14 <b>"</b> ø | 0.05                    | 1401-2000    | < 15                 | < 17                   | 20"X17" | 0.40                          | ELECTRICAL POWER: 120V |
| 16           | ENVIRO-TEC<br>SDR          | 16"ø          | 0.06                    | 2001-3000    | < 15                 | < 19                   | 24"X17" | 0.55                          | ELECTRICAL POWER: 120V |
| 19           | ENVIRO-TEC<br>SDR          | 28X14         | 0.20                    | 3001-4400    | < 20                 | < 31                   | 30"X17" | 0.73                          | ELECTRICAL POWER: 120V |
| 22           | ENVIRO-TEC<br>SDR          | 32X16         | 0.14                    | 4401-5900    | < 24                 | < 32                   | 34"X17" | 0.99                          | ELECTRICAL POWER: 120V |

- WHERE REHEAT COIL IS REQUIRED, PROVIDE MODEL SDR-WC WITH FACTORY MATCHED COIL OR AS NOTED ON ROOM AIR TERMINAL UNIT SCHEDULE.
- 2. REHEAT WATER TEMPERATURE CONDITIONS ENTERING TEMPERATURE = 180°F AND LEAVING TEMPERATURE = 150°F

| 3  | REHEAT COIL  | MAX PI    | 21 (  | RASED | ON | 2 ROW | COII | WITH    | WATER | PRFSSLIRF   | DROP  | NOT | EXCEEDS | 10 | FT   | w c  |
|----|--------------|-----------|-------|-------|----|-------|------|---------|-------|-------------|-------|-----|---------|----|------|------|
| J. | NEITEAT COIL | MILYV I " | ). IS | DASED | ON | 2 NOW | COIL | 441 111 | WAILN | I INLOCUINE | וטאוט | NOI | LACELUS | 10 | 1 1. | W.C. |

| MARK OR             | DESCRIPTION                 | NECK 1  | FACE 3<br>DIMENSION | CFM<br>RANGE | MAX<br>STATIC PD<br>(IN W.C.) | MAX. | MAX TH | ROW @ | 50 FPM | 1 (FT) | REMARKS                                                                                    |
|---------------------|-----------------------------|---------|---------------------|--------------|-------------------------------|------|--------|-------|--------|--------|--------------------------------------------------------------------------------------------|
| SYMBOL              |                             | SIZE    | DIMENSION           | RANGE        | (IN W.C.)                     | NC   | 1-WAY  | 2-WAY | 3-WAY  | 4-WAY  |                                                                                            |
| $\nearrow$          | DIRECTIONAL AIR             | 6"X6"   | 11"X11"             | < 160        | 0.10                          | 20   | 23     | 16    | 17     | 11     |                                                                                            |
| <del></del>         | PATTERN WITH MODULAR CORES. | 8"X8"   | 13"X13"             | 161-280      | 0.10                          | 20   | 31     | 24    | 23     | 15     | 1) UNLESS OTHERWISE NOTED ON DRAWINGS.                                                     |
|                     |                             | 10"X10" | 15"X15"             | 281-400      | 0.10                          | 20   | 37     | 28    | 27     | 18     | (2) COORDINATE WITH ARCHITECTURAL DRAWINGS FOR CEILING GRID AND                            |
|                     |                             | 12"X12" | 17"X17"             | 401-500      | 0.10                          | 20   | 41     | 32    | 30     | 20     | BORDER TYPE.                                                                               |
|                     |                             | 14"X14" | 19"X19"             | 501-550      | 0.10                          | 20   | 43     | 33    | 31     | 21     | (3) APPLICABLE FOR GYP BOARD CEILING ONLY. FOR T-BAR CEILING, FACE                         |
| TWO-WAY DISCHARGE   |                             | 16"X16" | 21"X21"             | 551-710      | 0.10                          | 20   | 49     | 38    | 36     | 24     | DIMENSION SHALL BE 24"X24".                                                                |
| 1                   |                             | 18"X18" | 23"X23"             | 711-850      | 0.10                          | 20   | 52     | 40    | 38     | 26     |                                                                                            |
| >-                  |                             | 20"X20" | 25"X25"             | 851-1000     | 0.10                          | 20   | 58     | 45    | 43     | 28     | (4) PROVIDE DUCT TO NECK TRANSITION AS REQUIRED.                                           |
| THREE-WAY DISCHARGE |                             |         |                     |              |                               |      |        |       |        |        | 5 FURNISH WITH ADAPTOR MOUNTING FRAME, TITUS MODEL TRM, FOR GYP BOARD CEILING APPLICATION. |
| <u>+</u>  X         |                             |         |                     |              |                               |      |        |       |        |        |                                                                                            |
|                     |                             |         |                     |              |                               |      |        |       |        |        |                                                                                            |
| OUR-WAY DISCHARGE   |                             |         |                     |              |                               |      |        |       |        |        |                                                                                            |

| CEIL             | ING RET   | URN/EXHA                       | NUST      | T/TRANS   | FER GRILLE SCHEDULE, CG-1 (TITUS MODEL "350RL")                                                                                   |
|------------------|-----------|--------------------------------|-----------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|
| NECK             | RI        | ETURN/EXHAUST                  |           | TRANSFER  |                                                                                                                                   |
| NECK<br>SIZE (1) | CFM RANGE | MAX NEG STATIC<br>PD (IN W.C.) | MAX<br>NC | CFM RANGE | REMARKS                                                                                                                           |
| 6" x 6"          | < 130     | 0.10                           | 25        | _         | A LINE SOO OTHERWOOD MOTER ON DRAWING                                                                                             |
| 8" x 8"          | 131-220   | 0.10                           | 25        | < 80      | 1) UNLESS OTHERWISE NOTED ON DRAWINGS.                                                                                            |
| 10" × 10"        | 221-290   | 0.10                           | 25        | 81–130    | (2) COORDINATE WITH ARCHITECTURAL DRAWINGS FOR CEILING TYPE.                                                                      |
| 12" x 12"        | 291-350   | 0.05                           | 25        | 131–190   | 3 ALL DAMPERS, EQUALIZING GRIDS, DUCT SURFACES, AND OTHER ACCESSORIES AND VISIBLE THROUGH AIR OUTLETS SHALL BE FLAT BLACK FINISH. |
| 14" x 14"        | 351-420   | 0.05                           | 25        | 191–270   |                                                                                                                                   |
| 16" x 16"        | 421-480   | 0.03                           | 25        | 271-350   |                                                                                                                                   |
| 18" x 18"        | 481-560   | 0.03                           | 25        | 351-450   | (5) FURNISH WITH ADAPTOR MOUNT FRAME, TITUS MODEL TRM, FOR GYP BOARD CEILING APPLICATION.                                         |
| 20" x 20"        | 561-640   | 0.03                           | 25        | 451-560   |                                                                                                                                   |
| 22" X 22"        | 641-865   | 0.03                           | 26        | 561-670   |                                                                                                                                   |

# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808 CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE BUILDING " O " RECORD DRAWING

CLIENT PROJECT NUMBER: 3045-002-00

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640 (310) 241-6550 (310) 842-8700

(310) 536-7676 Schirmer Engineering (310) 782-0850

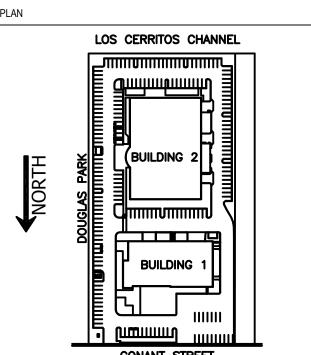
GNATURE BLOCK

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

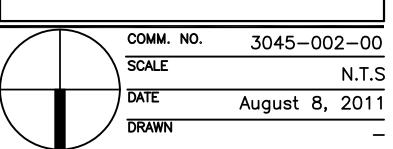
ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

**REVISION HISTORY - THIS SHEET** 



# SCHEDULES



RECORD DRAWING

|                    | FAN SCHE                         | DULE                       |                  |                        |       |                  |       |          |             |               |         |         |               |                |                               |                                                                    |
|--------------------|----------------------------------|----------------------------|------------------|------------------------|-------|------------------|-------|----------|-------------|---------------|---------|---------|---------------|----------------|-------------------------------|--------------------------------------------------------------------|
|                    |                                  |                            |                  |                        |       |                  |       |          | VSD         | MOTOR         |         | VIBRATI | ON ISOLATIO   | N              |                               |                                                                    |
| EQUIP.<br>NO.      | MANUFACTURER<br>AND<br>MODEL NO. | LOCATION<br>AND<br>SHT REF | AREA<br>SERVED   | TYPE                   | CFM   | S.P<br>(IN. W.C) | RPM   | DRIVE    | (YES/NO)    | VOLT/PH/HZ BH | HP HP   | FRAME   | ISOL.<br>TYPE | DEFL.<br>(IN.) | OPERATING<br>WEIGHT<br>(LBS.) | REMARKS                                                            |
| EF<br>1<br>EF<br>2 | COOK<br>16SP10D                  | ROOM 102<br>M201A          | ELEV. ROOM       | WALL<br>PROPELLER      | 700   | 0.125            | 669   | DIRECT   | NO          | 115/1/60 0.0  | 1/6     | -       | -             | -              | 105                           | FURNISHED WITH FAN SPEED CONTROLLER (5 AMP/120 VOLT).              |
| EF 2               |                                  | ROOF<br>M204A              | ELEC. RM 301 —   |                        |       |                  |       | EXISTING | EXHAUST FAN | TO REMAIN     |         |         |               |                |                               |                                                                    |
| EF<br>3            |                                  | ROOF<br>M204A              | GENERAL -        |                        |       |                  |       | EXISTING | EXHAUST FAN | TO REMAIN -   |         |         |               |                |                               |                                                                    |
| EF<br>4            | COOK<br>ACRU-D 120R              | ROOF<br>M204A              | HIGH BAY STORAGE | CENTRIFUGAL<br>UPBLAST | 1,300 | 0.25             | 1,140 | DIRECT   | NO          | 115/1/60 0.1  | 03 1/6  | -       | _             | -              | 80                            | FURNISH WITH PREFABRICATED ROOF CURB AND GRAVITY BACKDRAFT DAMPER. |
| EF 5               | COOK<br>ACRU-D 120R              | ROOF<br>M204A              | HIGH BAY STORAGE | CENTRIFUGAL<br>UPBLAST | 1,300 | 0.25             | 1,140 | DIRECT   | NO          | 115/1/60 0.1  | 03 1/6  | -       | _             | -              | 80                            | FURNISH WITH PREFABRICATED ROOF CURB AND GRAVITY BACKDRAFT DAMPER. |
| EF<br>6            |                                  | ROOF<br>M204A              | UNKNOWN -        |                        |       |                  |       | EXISTING | EXHAUST FAN | TO REMAIN     |         |         |               |                |                               |                                                                    |
| EF<br>7            | COOK<br>ACRU-B 100R3B            | MECH. WELL<br>M205A        | ELEC. ROOM 106   | CENTRIFUGAL<br>UPBLAST | 600   | 1.00             | 1,952 | BELT     | NO          | 115/1/60 0.2  | 211 1/4 | -       | -             | -              | 80                            | FURNISH WITH PREFABRICATED ROOF CURB AND GRAVITY BACKDRAFT DAMPER. |

|              | INSTANTA                           | NEOUS HE                   | EATII  | NG HO    | TAW TC            | ER E          | 3OIL         | .ER          | SCHE                         | EDULI                    | E      |     |              |            |                                      |                               |                  |
|--------------|------------------------------------|----------------------------|--------|----------|-------------------|---------------|--------------|--------------|------------------------------|--------------------------|--------|-----|--------------|------------|--------------------------------------|-------------------------------|------------------|
|              |                                    |                            | CAPACI | TY (MBH) |                   |               | WATE         | R COIL       |                              | FUE                      | L      |     | BURNER       | R (GAS)    |                                      |                               |                  |
| EQUIP<br>NO. | . MANUFACTURER<br>AND<br>MODEL NO. | LOCATION<br>AND<br>SHT REF | INPUT  | OUTPUT   | EFFICIENCY<br>(%) | FLOW<br>(GPM) | ENT.<br>(°F) | LVG.<br>(°F) | PRESS.<br>LOSS<br>(FT. W.C.) | NATUR<br>GAS<br>(CFH) (I | 5      | HP  | MAX.<br>AMP. | VOLT/PH/HZ | RELIEF<br>VALVE<br>SETTING<br>(PSIG) | OPERATING<br>WEIGHT<br>(LBS.) | REMARKS          |
| B 1          | RAYPAK<br>HI DELTA – 402B          | MECHANICAL WELL<br>M205A   | 399    | 335      | 84                | 23            | 150          | 180          | 1.0                          | 399                      | 7–10.5 | 1/2 | 6.9          | 120/1/60   | 45                                   | 500                           | SEE NOTES 123456 |
|              |                                    |                            |        |          |                   |               |              |              |                              |                          |        |     |              |            |                                      |                               |                  |

1) FURNISH WITH INTEGRATED 1/2 HP CIRCULATING PUMP.

(2) VENT LOCATION - TOP. NO VENT CAP. FIELD INSTALLED B-VENT.

(3) FURNISH WITH COLD WATER START PACKAGE.

4 WATER CONNECTION - LEFT.

(5) 2-STAGE FIRING MODE.

6 OUTDOOR UNIT.

|               | PUMP SCH                         | IEDULE                     |        |     |                 |             |      |     |                 |                 |                               |            |
|---------------|----------------------------------|----------------------------|--------|-----|-----------------|-------------|------|-----|-----------------|-----------------|-------------------------------|------------|
| EQUIP.<br>NO. | MANUFACTURER<br>AND<br>MODEL NO. | LOCATION<br>AND<br>SHT REF | TYPE   | GPM | DYNAMIC<br>HEAD | EFF.<br>(%) | ВНР  | HP  | MO <sup>-</sup> | FOR  VOLT/PH/HZ | OPERATING<br>WEIGHT<br>(LBS.) | REMARKS    |
| P             | GOULDS                           | MECHANICAL WELL            | INLINE | 23  | (FT.)<br>       | 62          | 0.73 | 1.0 | 1750            | , ,             | 100                           | SEE NOTE 1 |
| 1/            | 3SVA7E2F0                        | M205A                      |        |     |                 |             |      |     |                 | , ,             |                               |            |

NOTES: 1 OUTDOOR APPLICATION.

|               | EXPANSIO               | N TANK S                 | CHEDU                | LE      |                 |                  |                  |               |                 |                 |                                  |
|---------------|------------------------|--------------------------|----------------------|---------|-----------------|------------------|------------------|---------------|-----------------|-----------------|----------------------------------|
|               | MANUFACTURER           | LOCATION                 |                      |         | TANK            | ASME             | PRE-             | DIME          | NSION           | OPERATING       |                                  |
| EQUIP.<br>NO. | AND MODEL NO.          | AND<br>SHT REF           | SYSTEM<br>SERVED     | TYPE    | VOLUME<br>(GAL) | RATING<br>(PSIG) | CHARGE<br>(PSIG) | DIA.<br>(IN.) | HEIGHT<br>(IN.) | WEIGHT<br>(LBS) | REMARKS                          |
| ET 1          | BELL & GOSSETT<br>B400 | MECHANICAL WELL<br>M205A | HEATING HOT<br>WATER | BLADDER | 105             | 125              | 12               | 24            | 66              | 1,200           | FURNISH WITH BASE MOUNTING RING. |

| SYSTEM      | TYPE                         | PIPE SIZE | MAXIMUM<br>GPM |
|-------------|------------------------------|-----------|----------------|
|             | BLACK STEEL                  | 18"       | 5500           |
|             | BLACK STEEL                  | 16"       | 4200           |
|             | BLACK STEEL                  | 14"       | 3300           |
|             | BLACK STEEL                  | 12"       | 2600           |
|             | BLACK STEEL                  | 10"       | 1800           |
|             | BLACK STEEL                  | 8"        | 1200           |
|             | BLACK STEEL                  | 6"        | 700            |
|             | BLACK STEEL                  | 5"        | 500            |
| CHILLED AND | BLACK STEEL                  | 4"        | 280            |
| HOT WATER   | BLACK STEEL<br>COPPER TYPE L | 3"        | 140.0<br>130.0 |
|             | BLACK STEEL COPPER TYPE L    | 2-1/2"    | 80.0<br>82.0   |
|             | BLACK STEEL COPPER TYPE L    | 2"        | 50.0<br>46.0   |
| _           | BLACK STEEL                  | 1-1/2"    | 25.0           |
|             | COPPER TYPE L  BLACK STEEL   | 1-1/4"    | 21.5<br>17.0   |
|             | COPPER TYPE L  BLACK STEEL   | 1"        | 13.2<br>8.0    |
|             | COPPER TYPE L  BLACK STEEL   | 3/4"      | 7.6            |
| -           | COPPER TYPE L BLACK STEEL    |           | 3.6<br>1.9     |
|             | COPPER TYPE L                | 1/2"      | 1.3            |

| AIR SEPARATOR SCHEDULE |                                  |                      |                           |                              |                               |         |  |
|------------------------|----------------------------------|----------------------|---------------------------|------------------------------|-------------------------------|---------|--|
| ITEM<br>NO.            | MANUFACTURER<br>AND<br>MODEL NO. | SYSTEM<br>SERVED     | MIN.<br>CAPACITY<br>(GPM) | CONNECTION<br>SIZES<br>(IN.) | OPERATING<br>WEIGHT<br>(LBS.) | REMARKS |  |
| AS<br>1                | BELL & GOSSETT<br>R-2            | HEATING HOT<br>WATER | 23                        | 2                            | 70                            |         |  |

# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

CLIENT PROJECT NAME: LONG BEACH CITY COLLEGE BUILDING " O "

RECORD DRAWING

CLIENT PROJECT NUMBER: 3045-002-00

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640

**(**310) 241-6550

(310) 782-0850

(310) 842-8700

(310) 536-7676 SECURITY
Schirmer Engineering

IGNATURE BLOCK

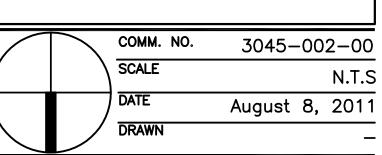
CONTRACTOR'S RECORDED CHANGES DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

**REVISION HISTORY - THIS SHEET** 

SCHEDULES



RECORD DRAWING



BUILDING 1 - FIRST FLOOR DEMOLITION PLAN

1/8" = 1'-0"

# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE BUILDING " O "

RECORD DRAWING

COLLEGE

CLIENT PROJECT NUMBER: 3045-002-00

ARCHITECT:



(323) 733-2640

(310) 842-8700

(310) 782-0850

**(**310) 241-6550

Vantage Technology Consulting Group (310) 536-7676

SECURITY
Schirmer Engineering

CONTRACTOR'S RECORDED CHANGES DOCUMENTS. WE ACCEPT NO

RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

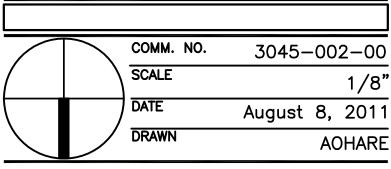
ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

**REVISION HISTORY - THIS SHEET** 

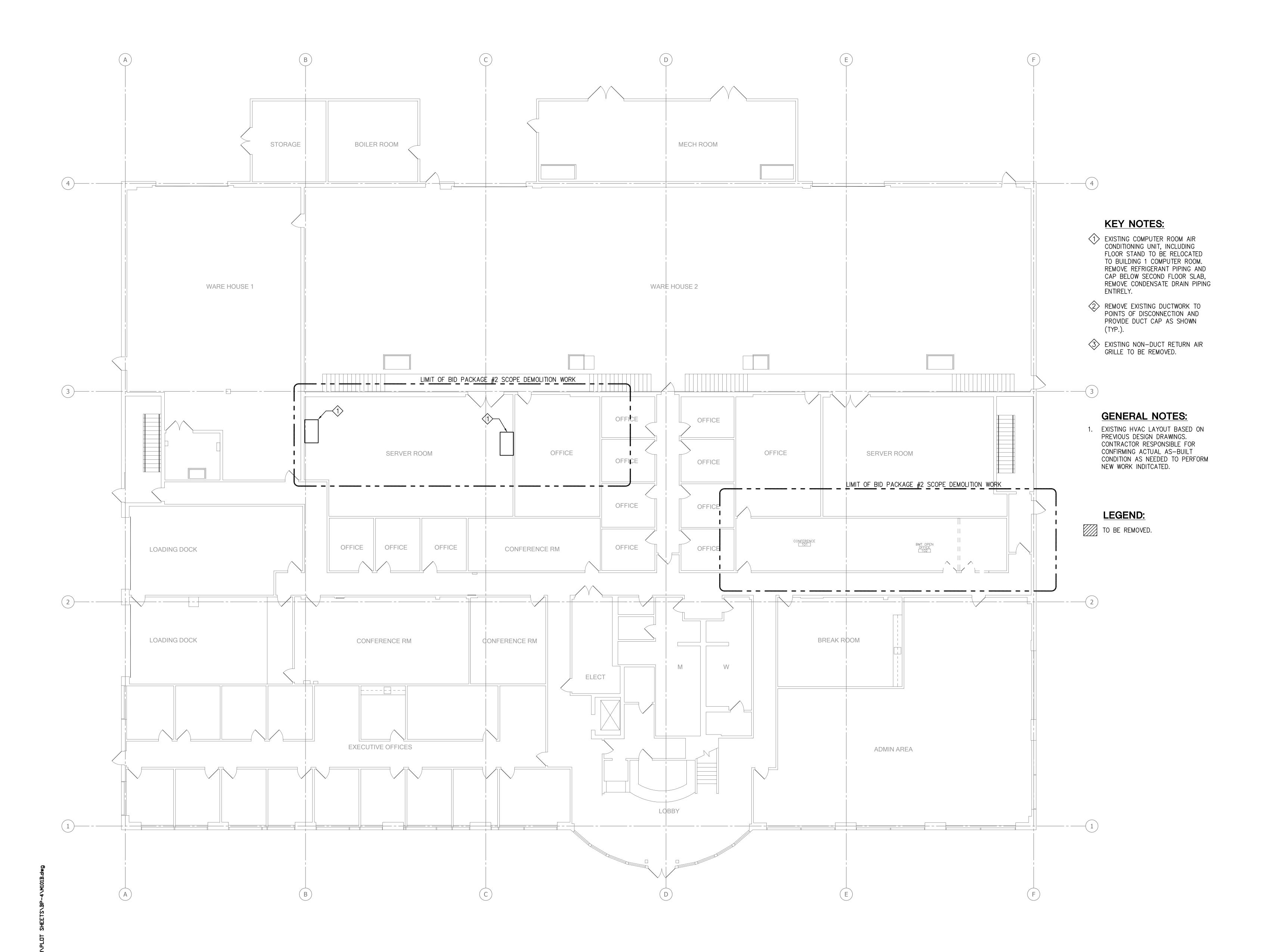
LOS CERRITOS CHANNEL

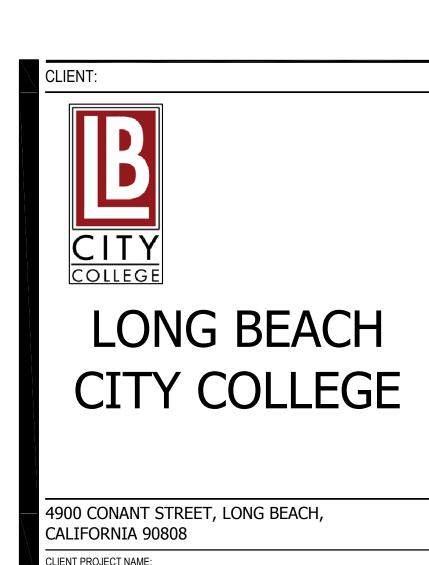
BUILDING 1 -FIRST FLOOR **DEMOLITION PLAN** 



RECORD DRAWING

M101A





CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE
BUILDING " O "

CLIENT PROJECT NUMBER: 3045-002-00

RCHITECT:

RECORD DRAWING

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067

**(**310) 241-6550

(310) 782-0850

Los Angeles, California USA 90067
Telephone 310.557.7600 Facsimile 310.553.1668

SULTANTS:

UCTURAL
lekirk & Sabol (323) 733-2640

MECHANICAL / ELECTRICAL / PLUMBING
M-E Engineers (310) 842-8700

DATA / TELECOM
Vantage Technology Consulting Group (310) 536-7676

SECURITY
Schirmer Engineering

SIGNATURE BI

CONTRACTOR'S RECORDED CHANGES
HAVE BEEN TRANSFERRED TO THESE
DOCUMENTS. WE ACCEPT NO
RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND
DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

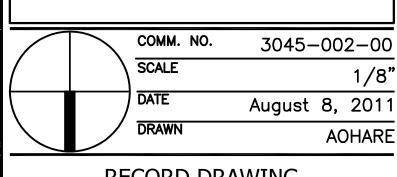
REVISION HISTORY - THIS SHEET

LOS CERRITOS CHANNEL

HUNDING 2

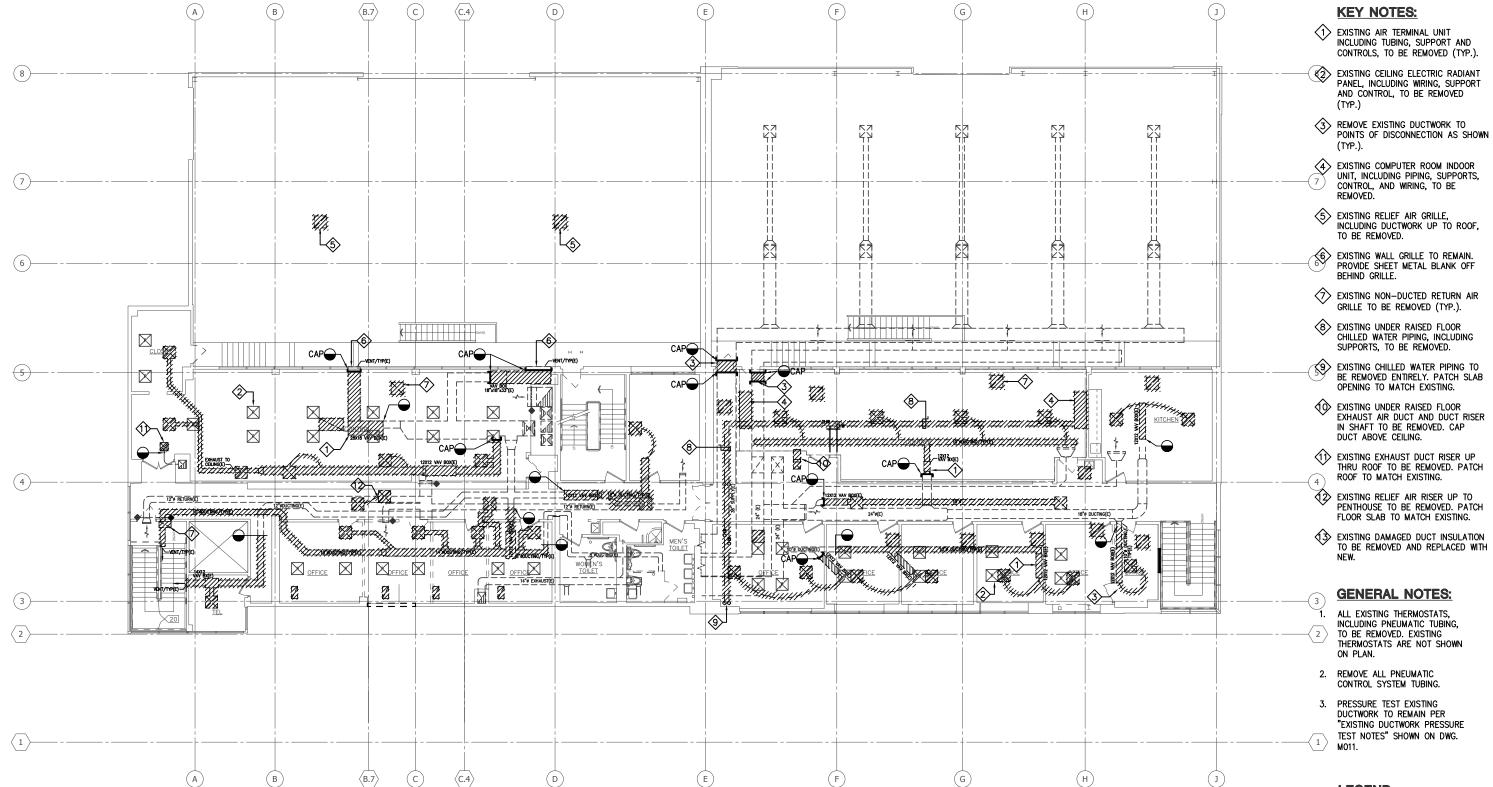
BUILDING 1

BUILDING 2-MECHANICAL FIRST FLOOR DEMOLITION PLAN



RECORD DRAWING

M101B



1) BUILDING 1 - SECOND FLOOR DEMOLITION PLAN



# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

ENT DRO JECT NAME:

LONG BEACH CITY COLLEGE

Building " 0 " Record Drawing

3045-002-00

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(310) 536-7676

ONSULTANTS:
TRUCTURAL
Igleklirk & Sabol (323) 733-2640

CONTRACTOR'S RECORDED CHANGES

HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO

DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND

1

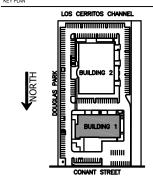
### LEGEND:



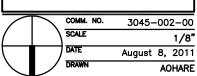
\_\_\_\_

08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

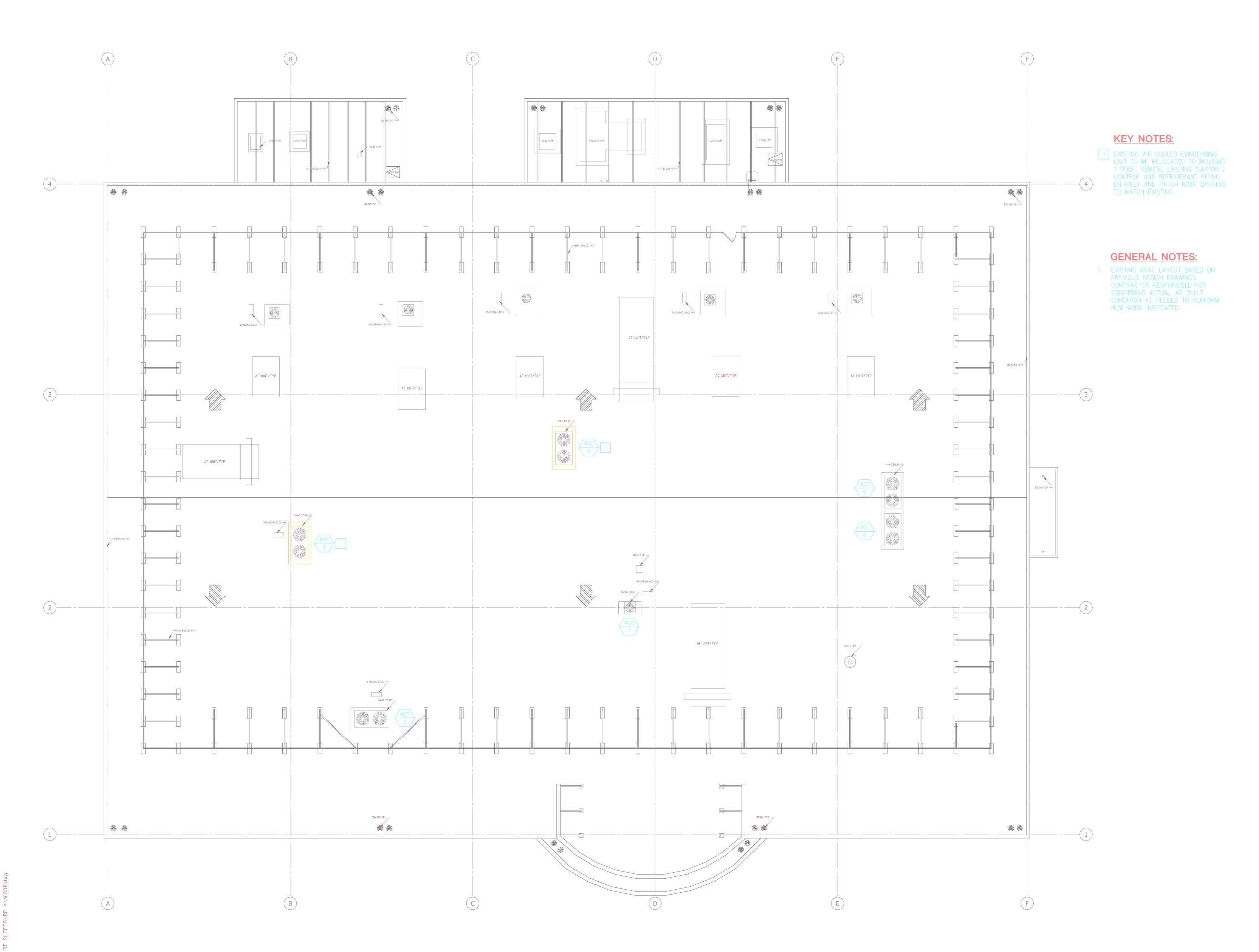


BUILDING 1 -MECHANICAL SECOND FLOOR DEMOLITION PLAN



RECORD DRAWING

M102A



CLIENT:

B
CITY
COLLEGE

LONG BEACH
CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE
BUILDING " O "
RECORD DRAWING

CLIENT PROJECT NUMBER
3045-002-00

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608

Los Angeles, California USA 90067
Telephone 310.557.7600 Facsimile 310.553.1668

CONSULTANTS:

Englekirk & Sabol

CIVIL
JMC2

MECHANICAL / ELECTRICAL / PLUMBING

M-E Engineers

DATA / TELECOM

Vantage Technology Consulting Group

SECURITY
Schirmer Engineering

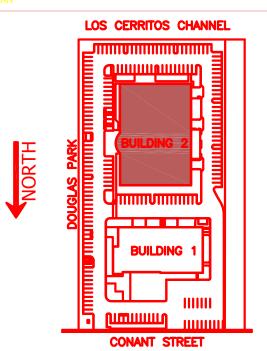
SIGNATURE

CONTRACTOR'S RECORDED CHANGES
HAVE BEEN TRANSFERRED TO THESE
DOCUMENTS. WE ACCEPT NO
RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND
DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

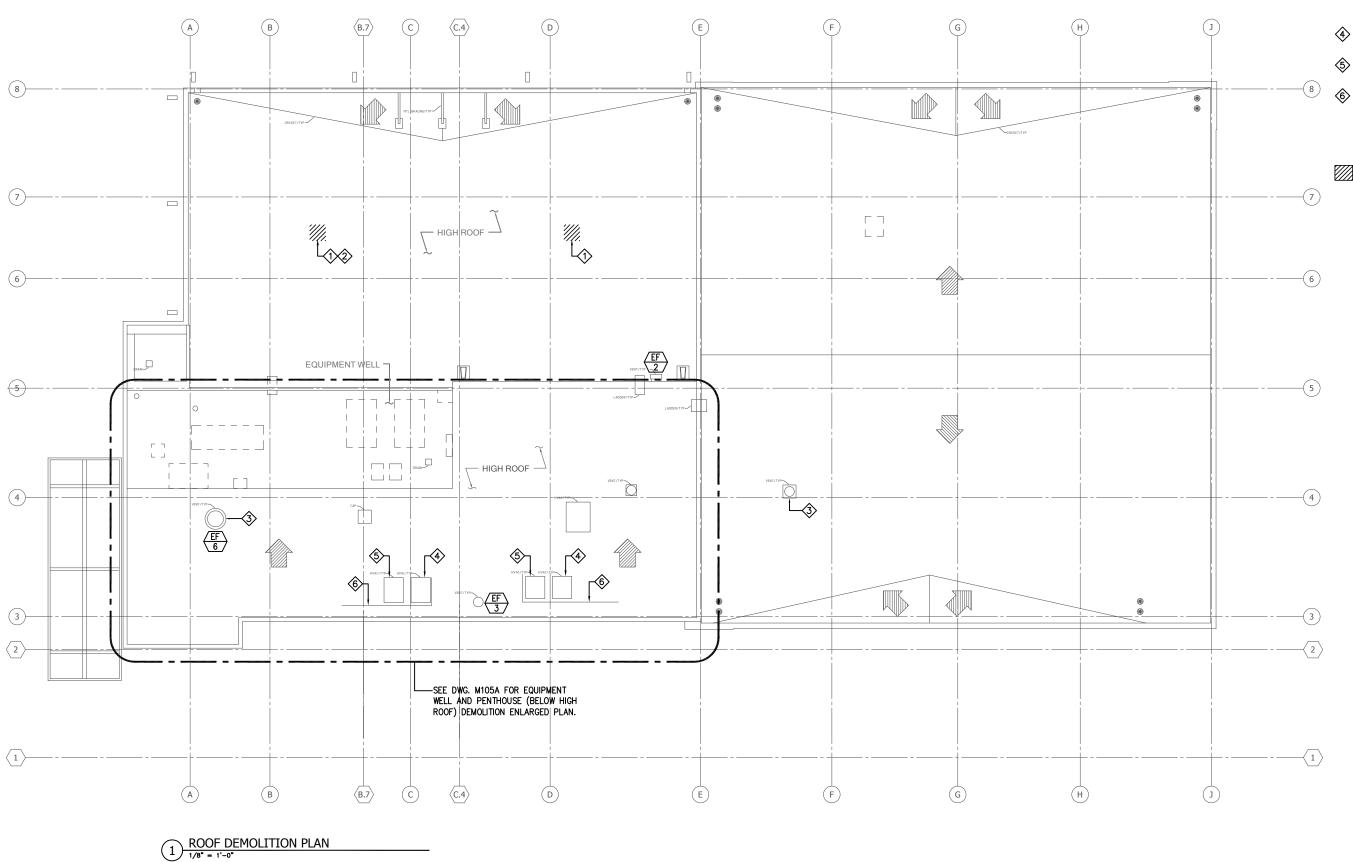
08.08.2011- RECORD DRAV

REVISION HISTORY - THIS SHEET



BUILDING 2-MECHANICAL ROOF DEMOLITION PLAN

M103B



**KEY NOTES:** 

- EXISTING GRAVITY VENT GOOSE NECK, INCLUDING CURB, TO BE REMOVED.
- PATCH ROOF TO MATCH EXISTING.
- SEXISTING EXHAUST AIR FAN TO REMAIN AND APPEARS ABANDONED IN PLACE. FUNCTION UNKNOWN.
  CONTRACTOR TO FIELD SURVEY CONNECTING DUCTWORK AND PROVIDE DRAWING SHOWING EXISTING DUCTWORK ROUTING. SUBMIT DRAWINGS FOR REVIEW.
- EXISTING OUTSIDE AIR DUCT TO REMAIN. CAP BELOW ROOF.
- \$\frac{\existing relief air duct to remain. Cap below roof.
- EXISTING EQUIPMENT SCREEN TO REMAIN.

### LEGEND:

TO BE REMOVED.

Architecture | Engineering | Planning | Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 | Los Angeles, California USA 90067 | Telephone 310.557.7600 Facsimile 310.553.1668 | ONSULTANTS | ONSULTANTS | ORGANICAL |

HQ.

LONG BEACH

**CITY COLLEGE** 

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

ONG BEACH CITY COLLEGE

BUILDING " O " RECORD DRAWING

045-002-00

SIGNATURE BLO

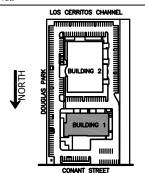
CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

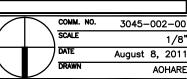
08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

KEY PLAN



BUILDING 1-MECHANICAL ROOF DEMOLITION PLAN

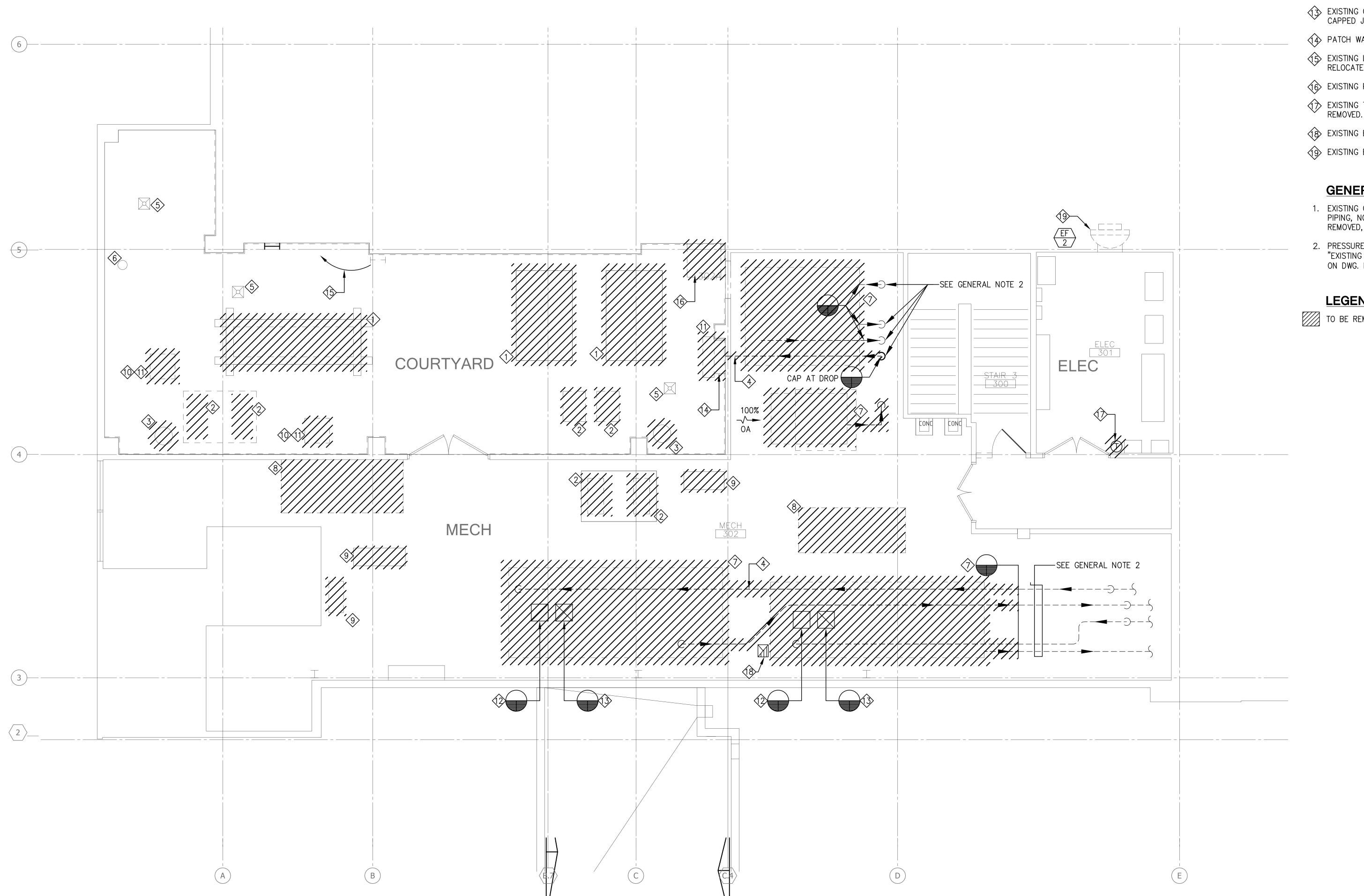


RECORD DRAWING

M104A

COPYRIGHT HAMMEL GREEN AND ABRAHAMSON, INC.

RIVERS INCIDENTIFICATION SHEETS BP-4 MID46.000



# **KEY NOTES:**

- (1) EXISTING COOLING TOWER INCLUDING CONCRETE PAD, PIPING, CONTROLS, AND SUPPORT TO BE REMOVED.
- 2 EXISTING PUMP INCLUDING CONCRETE PAD, PIPING, SUPPORTS AND CONTROLS, TO BE REMOVED.
- 3 EXISTING CHEMICAL FEEDER INCLUDING CONCRETE PAD, PIPING AND ACCESSORIES TO BE REMOVED.
- 4 EXISTING DUCT TO BE REMOVED UP TO POINT OF
- DISCONNECTION. TYP.
- 5 EXISTING FLOOR SINK. SEE PLUMBING DRAWINGS.
- 6 EXISTING ROOF DRAIN. SEE PLUMBING DRAWINGS.
- EXISTING AIR HANDLING UNIT INCLUDING CONCRETE PAD, PIPING, SUPPORT, AND CONTROLS TO BE REMOVED. SUPPLY AND RETURN AIR DUCTS TO BE REMOVED UP TO POINT OF DISCONNECTION AS SHOWN.
- (8) EXISTING CHILLER INCLUDING CONCRETE PAD, PIPING, SUPPORT, AND CONTROL, TO BE REMOVED.
- 9 EXISTING AIR COMPRESSOR CONCRETE PAD, INCLUDING COOLING UNIT, REGULATOR, AND TUBING THROUGHOUT THE ENTIRE BUILDING, TO BE REMOVED.
- PATCH ROOF OPENING TO MATCH EXISTING.
- (1) EXISTING EXHAUST FAN INCLUDING CONCRETE PAD, DUCTWORK, CONTROLS, SUPPORT, AND ELECTRICAL, TO BE REMOVED.
- EXISTING RELIEF AIR DUCT TO BE REMOVED AND CAPPED JUST BELOW ROOF.
- EXISTING OUTSIDE AIR DUCT TO BE REMOVED AND CAPPED JUST BELOW ROOF.
- 14 PATCH WALL OPENING TO MATCH EXISTING.
- EXISTING LADDER UP TO HIGH ROOF TO BE RELOCATED TO THE LEFT. SEE ARCH. DWG.
- (6) EXISTING PAD TO BE REMOVED.
- EXISTING THERMOSTAT, INCLUDING WIRING, TO BE
- (8) EXISTING EXHAUST DUCT TO REMAIN.
- (19) EXISTING EXHAUST FAN TO REMAIN.

# **GENERAL NOTES:**

- EXISTING CHILLED WATER AND CONDENSER WATER PIPING, NOT SHOWN ON PLAN, TO BE COMPLETELY REMOVED, INCLUDING SUPPORTS.
- PRESSURE TEST EXISTING DUCTWORK TO REMAIN PER "EXISTING DUCTWORK PRESSURE TEST NOTES" SHOWN ON DWG. M011.

# **LEGEND**:

TO BE REMOVED.



COLLEGE

CLIENT:

# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE BUILDING " O " RECORD DRAWING

CLIENT PROJECT NUMBER: 3045-002-00

RCHITECT:

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608

Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668 CONSULTANTS: STRUCTURAL Englekirk & Sabol (323) 733-2640

**(**310) 241-6550

(310) 782-0850

M-E Engineers (310) 842-8700 /antage Technology Consulting Group (310) 536-7676

Schirmer Engineering

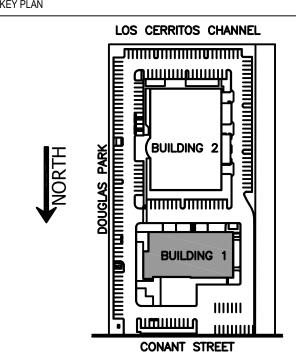
CONTRACTOR'S RECORDED CHANGES RESULTING FROM THESE CHANGES AND

ME-ENGINEERS DATE: 08-08-2011

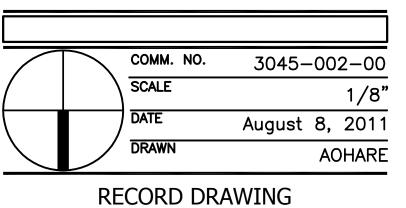
DO NOT VOUCH FOR THEIR ACCURACY.

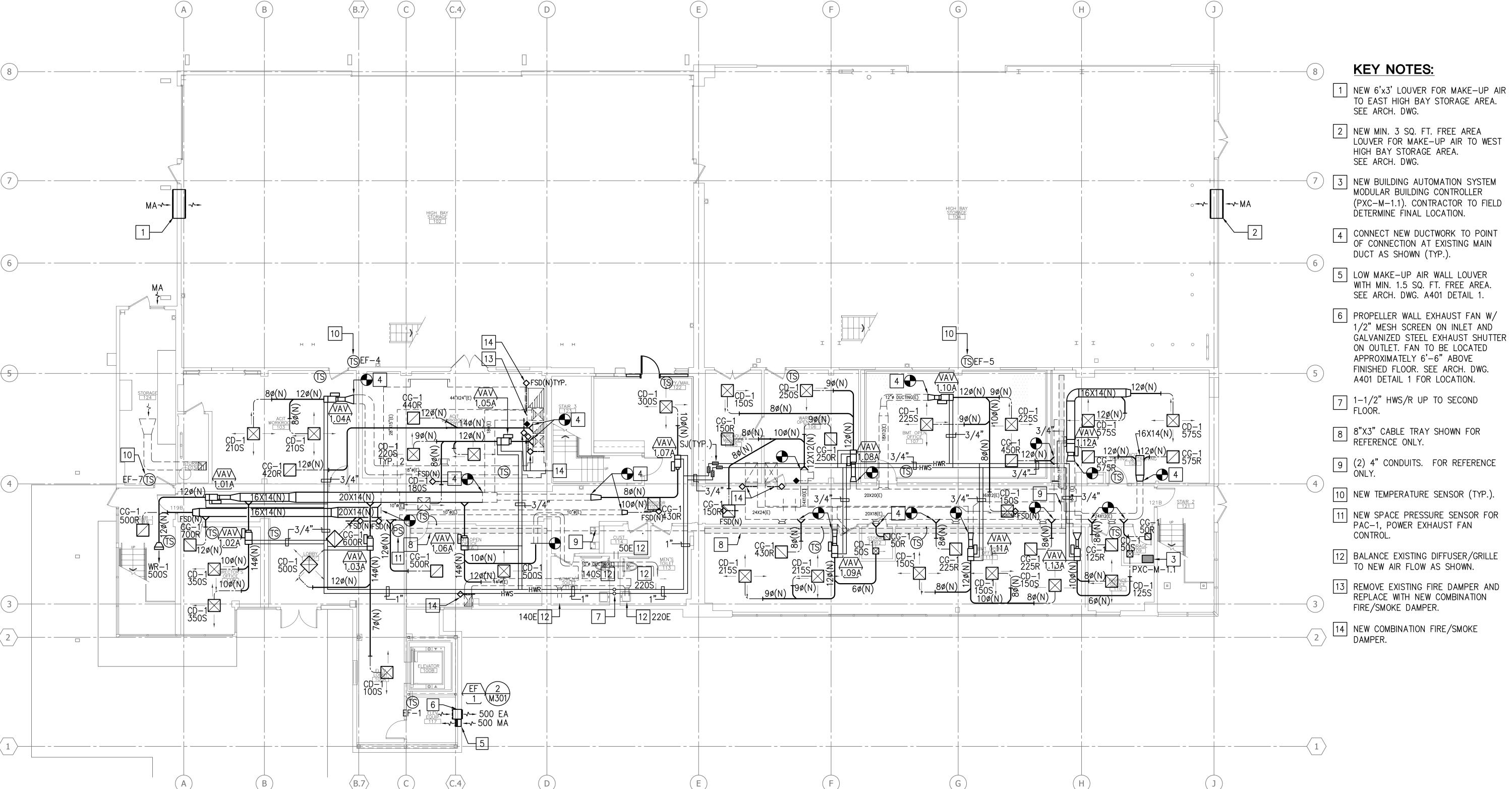
08.08.2011- RECORD DRAWING

**REVISION HISTORY - THIS SHEET** 



BUILDING 1-ENLARGED MECHANICAL ROOF DEMOLITION







4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

CLIENT PROJECT NAME:

LONG BEACH CITY COLLEGE BUILDING " O "

CLIENT PROJECT NUMBER:

RECORD DRAWING

3045-002-00

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640

**(**310) 241-6550 (310) 842-8700 /antage Technology Consulting Group (310) 536-7676 SECURITY
Schirmer Engineering

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE

RESPONSIBILITY FOR OR LIABILITY

RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

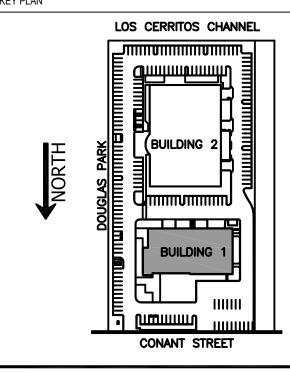
ME-ENGINEERS DATE: 08-08-2011

DOCUMENTS. WE ACCEPT NO

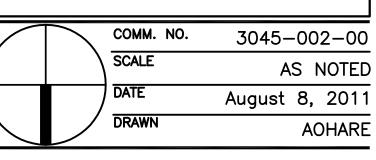
(310) 782-0850

08.08.2011- RECORD DRAWING

**REVISION HISTORY - THIS SHEET** 



BUILDING 1 -MECHANICAL FIRST FLOOR PLAN



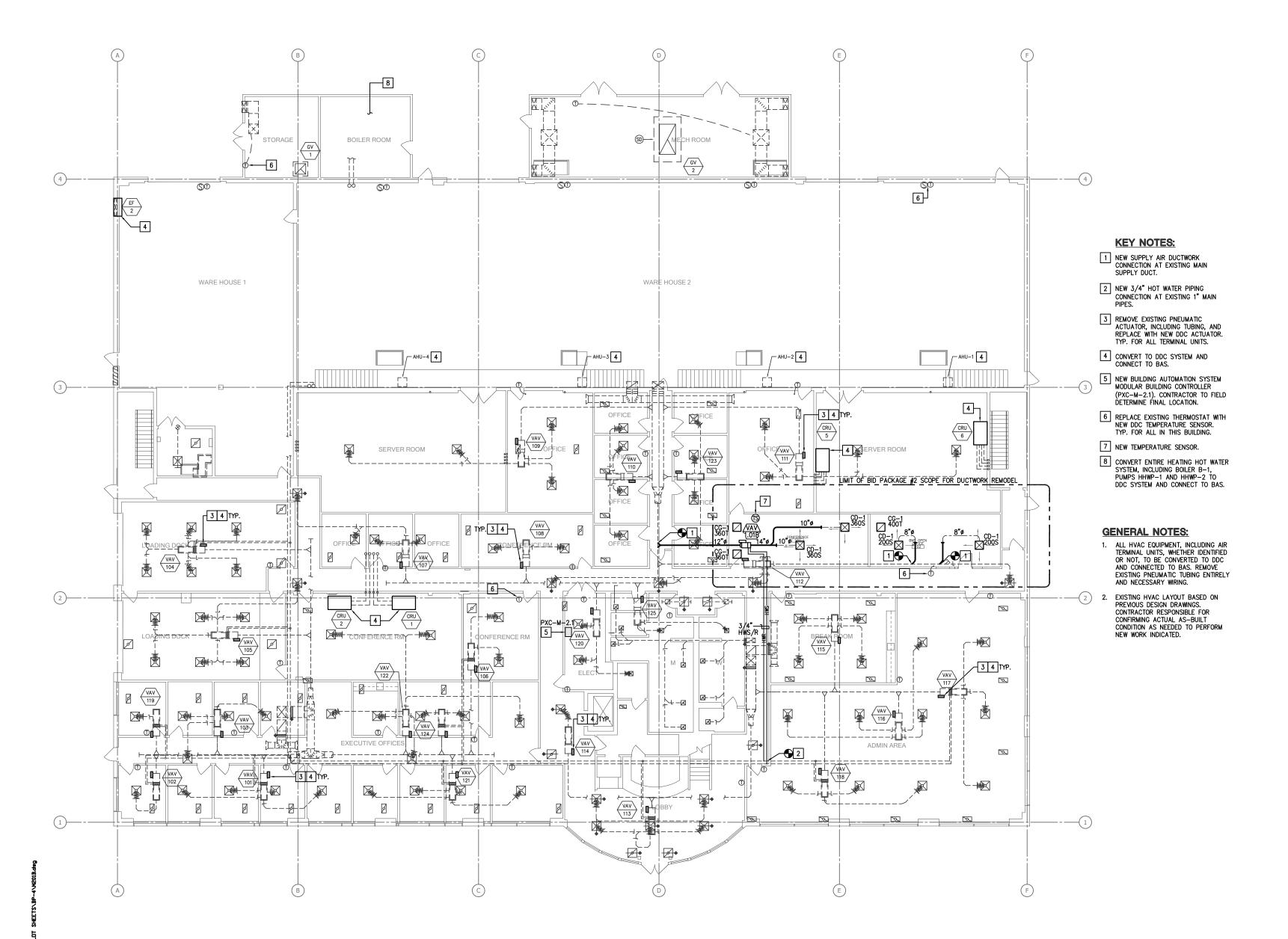
RECORD DRAWING

M201A

© COPYRIGHT HAMMEL GREEN AND ABRAHAMSON, INC.

BUILDING 1 - FIRST FLOOR PLAN

1/8" = 1'-0"



CITY

# LONG BEACH CITY COLLEGE

| 900 CONANT STREET, LONG BEACH, |  |  |  |  |  |  |  |  |
|--------------------------------|--|--|--|--|--|--|--|--|
| CALTEORNIA 90808               |  |  |  |  |  |  |  |  |

CALIFORNIA 90808

LONG BEACH CITY COLLEGE

ECORD DRAWING

3045-002-00



Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

NSULTANTS:

IRUCTURAL nglekirk & Sabol (323) 733-2640

MECHANICAL / ELECTRICAL / PLUMBING
M-E Engineers (310) 842-870

Vantage Technology Consulting Group (310) 536-7676

SECURITY
Schirmer Engineering (310)

SIGNATURE BLOO

CONTRACTOR'S RECORDED CHANGES
HAVE BEEN TRANSFERRED TO THESE
DOCUMENTS. WE ACCEPT NO
RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND

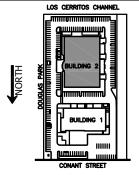
DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

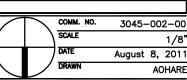
08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

KEY PLAN

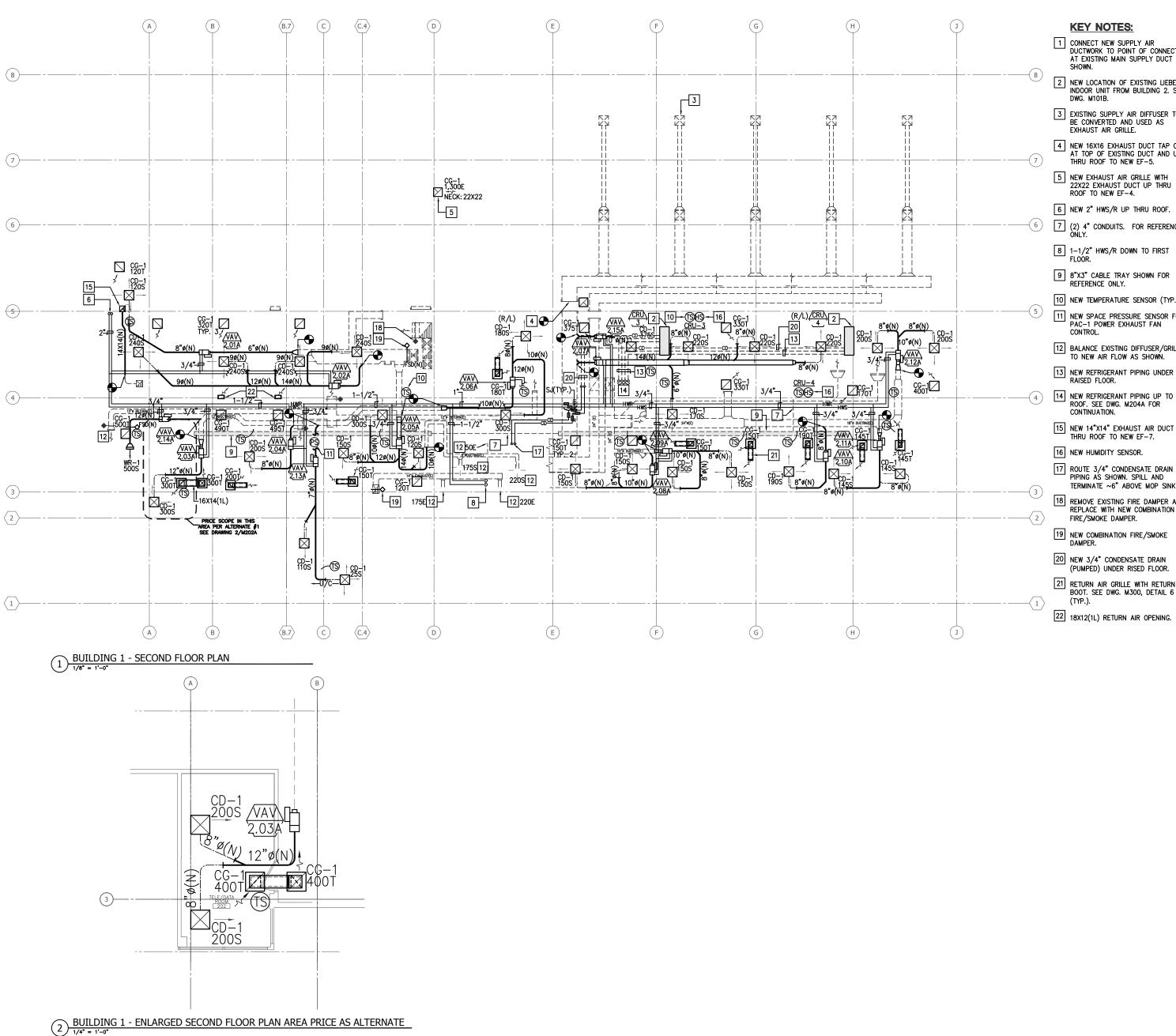


## BUILDING 2-MECHANICAL FIRST FLOOR PLAN



RECORD DRAWING

M201B



- 1 CONNECT NEW SUPPLY AIR
  DUCTWORK TO POINT OF CONNECTION
  AT EXISTING MAIN SUPPLY DUCT AS
- 2 NEW LOCATION OF EXISTING LIEBERT INDOOR UNIT FROM BUILDING 2. SEE
- 3 EXISTING SUPPLY AIR DIFFUSER TO BE CONVERTED AND USED AS
- 4 NEW 16X16 EXHAUST DUCT TAP OFF AT TOP OF EXISTING DUCT AND UP THRU ROOF TO NEW EF-5.
- 5 NEW EXHAUST AIR GRILLE WITH 22X22 EXHAUST DUCT UP THRU ROOF TO NEW EF-4.
- 6 NEW 2" HWS/R UP THRU ROOF.
- 7 (2) 4" CONDUITS. FOR REFERENCE ONLY.
- 9 8"X3" CABLE TRAY SHOWN FOR
- 10 NEW TEMPERATURE SENSOR (TYP.).
- 11 NEW SPACE PRESSURE SENSOR FOR PAC-1 POWER EXHAUST FAN
- BALANCE EXISTING DIFFUSER/GRILLE TO NEW AIR FLOW AS SHOWN.
- 14 NEW REFRIGERANT PIPING UP TO ROOF. SEE DWG. M204A FOR CONTINUATION.
- 15 NEW 14"X14" EXHAUST AIR DUCT UP THRU ROOF TO NEW EF-7.
- ROUTE 3/4" CONDENSATE DRAIN PIPING AS SHOWN. SPILL AND TERMINATE ~6" ABOVE MOP SINK.
- 18 REMOVE EXISTING FIRE DAMPER AND REPLACE WITH NEW COMBINATION
- 19 NEW COMBINATION FIRE/SMOKE
- 20 NEW 3/4" CONDENSATE DRAIN (PUMPED) UNDER RISED FLOOR.
- 21 RETURN AIR GRILLE WITH RETURN AIR BOOT. SEE DWG. M300, DETAIL 6



4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

ONG BEACH CITY COLLEGE BUILDING " O " ECORD DRAWING

045-002-00

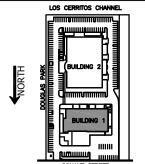
K. Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Perk East - Sulte 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

(310) 536-7676

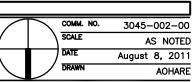
CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS, WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY. ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

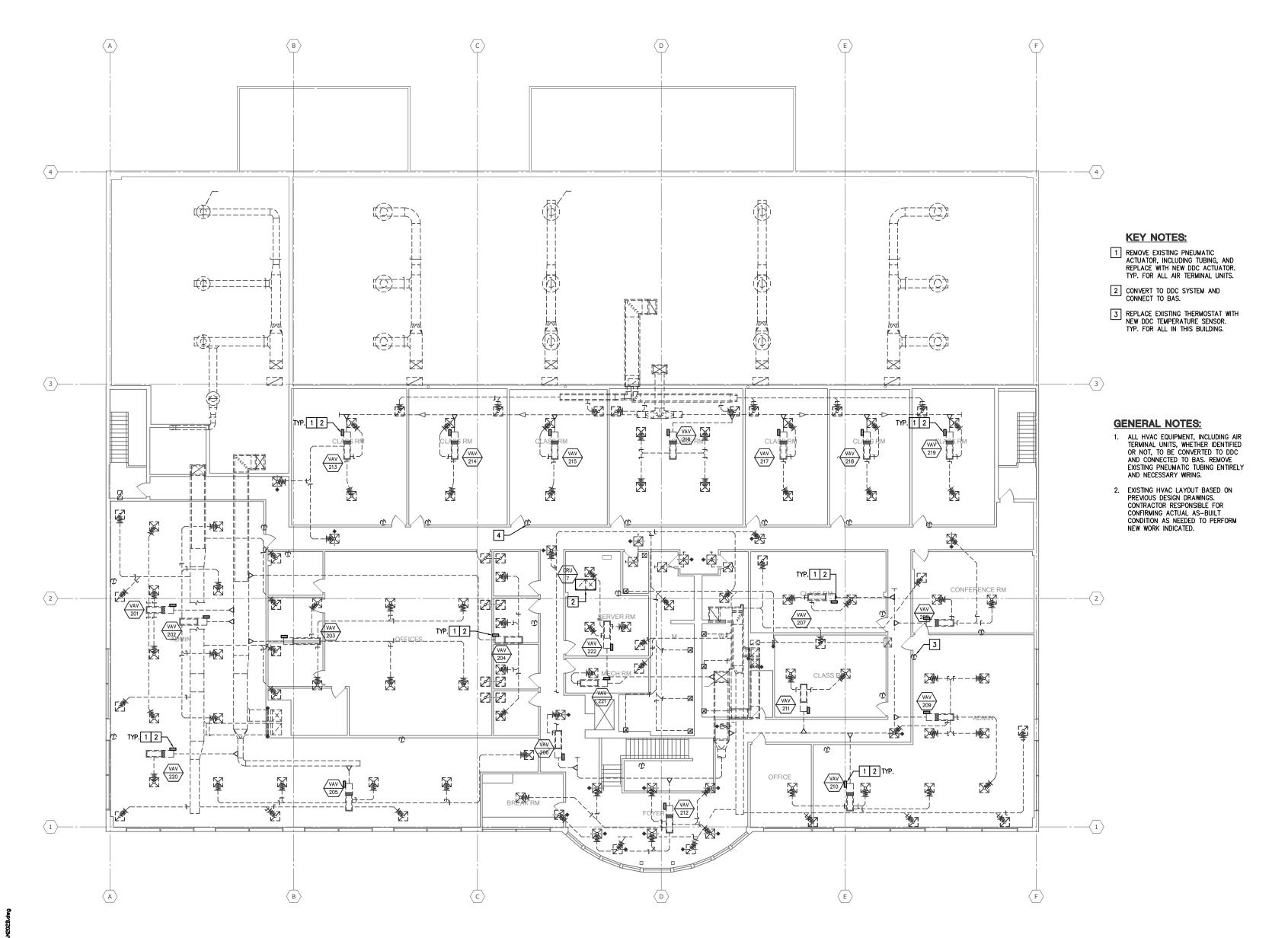


BUILDING 1 -MECHANICAL SECOND FLOOR PLAN



RECORD DRAWING

M202A





4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

ONG BEACH CITY COLLEGE UILDING " O "

ECORD DRAWING

045-002-00

K. Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

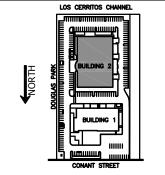
(310) 536-7676

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

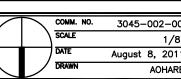
ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

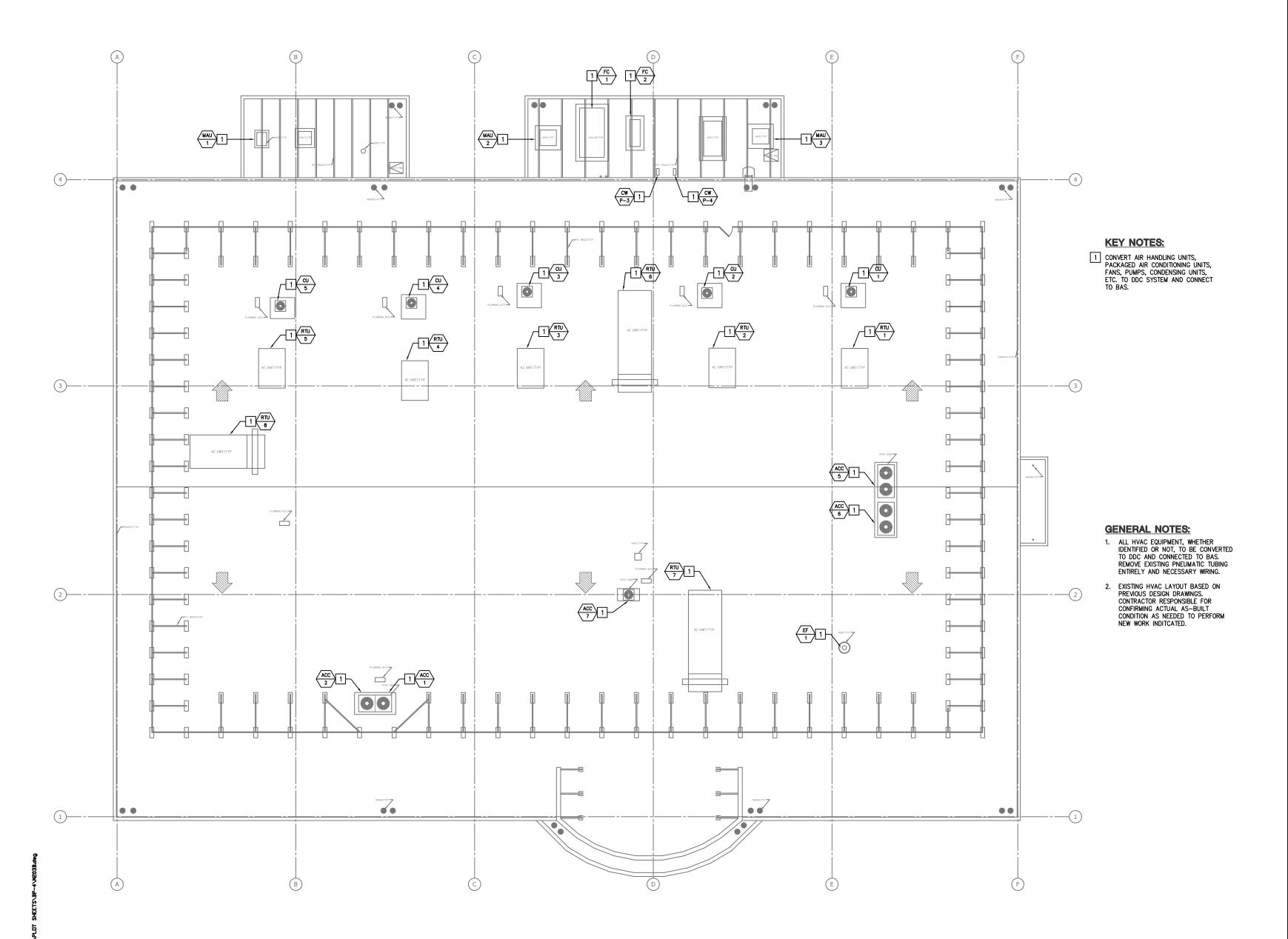
REVISION HISTORY - THIS SHEET



**BUILDING 2-MECHANICAL** SECOND FLOOR PLAN



M202B



CLIENT:



# LONG BEACH CITY COLLEGE

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

IENT DROIECT NAME:

LONG BEACH CITY COLLEGE BUILDING " O "

RECORD DRAWING

3045-002-00

cture | Engineering | Pla

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

ISULTANTS:

TRUCTURAL
nglekirk & Sabol (323) 733-

(310) 536-7676

MECHANICAL / ELECTRICAL / PLUMBIN

DATA / TELECOM
Vantage Technology Consulting Group

SECURITY

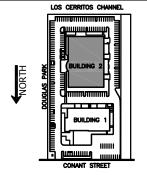
SIGNATURE BLC

CONTRACTOR'S RECORDED CHANGES
HAVE BEEN TRANSFERRED TO THESE
DOCUMENTS. WE ACCEPT NO
RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND
DO NOT VOUCH FOR THEIR ACCURACY.

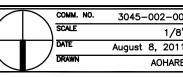
ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

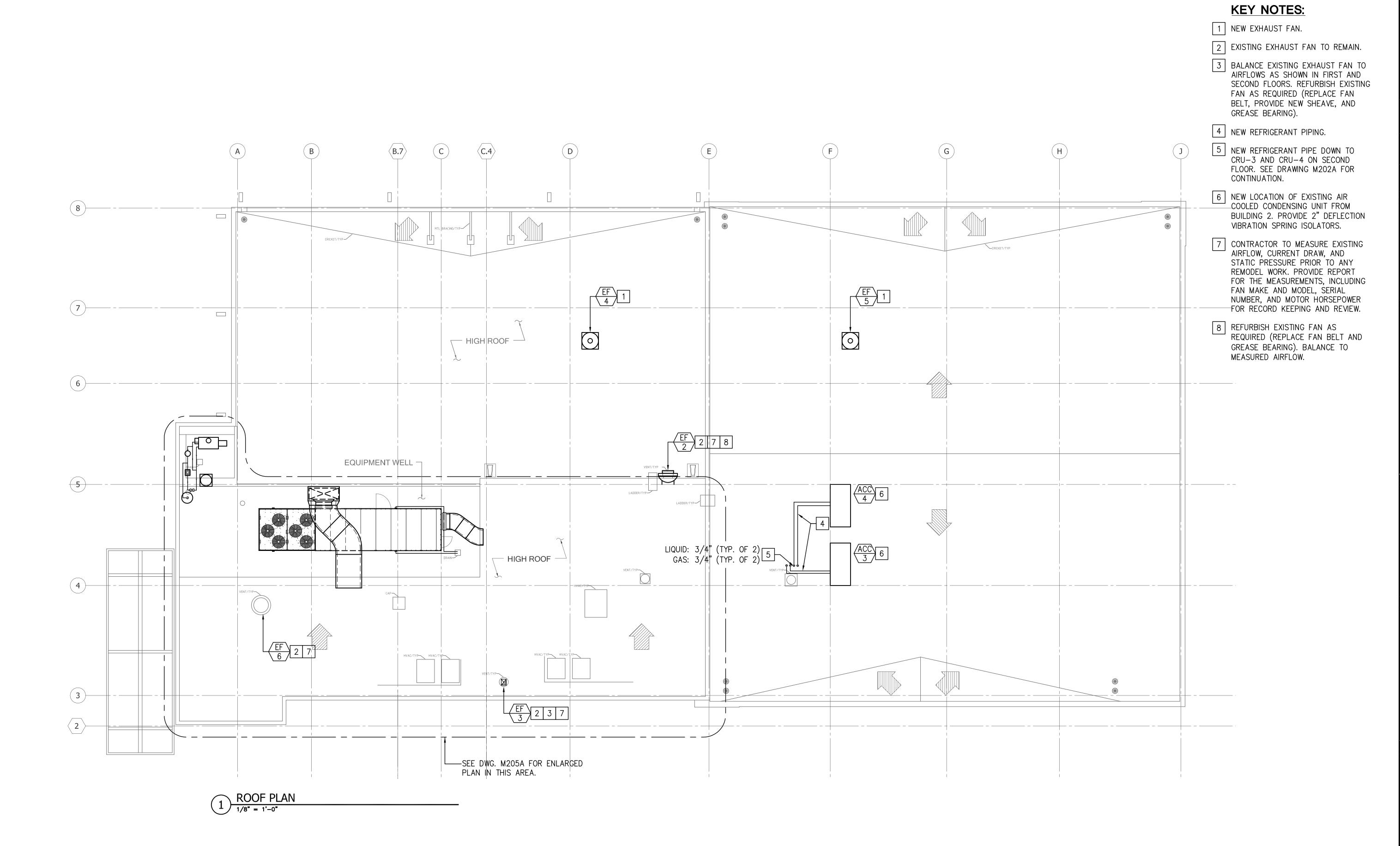


BUILDING 2-MECHANICAL ROOF PLAN



RECORD DRAWIN

M203E





4900 CONANT STREET, LONG BEACH,
CALIFORNIA 90808

CLIENT PROJECT NAME:
LONG BEACH CITY COLLEGE
BUILDING " O "

CLIENT PROJECT NUMBER:

3045-002-00

ARCHITECT:

RECORD DRAWING

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067

 STRUCTURAL
 (323) 733-2640

 Englekirk & Sabol
 (323) 733-2640

 CIVIL
 (310) 241-6550

 MECHANICAL / ELECTRICAL / PLUMBING
 (310) 842-8700

(310) 536-7676

(310) 782-0850

Telephone 310.557.7600 Facsimile 310.553.1668

SECURITY
Schirmer Engineering

DATA / TELECOM Vantage Technology Consulting Group

CONTRACTOR'S RECORDED CHANGES
HAVE BEEN TRANSFERRED TO THESE
DOCUMENTS. WE ACCEPT NO
RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND
DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

08.08.2011- RECORD DRAWING

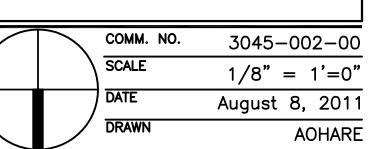
REVISION HISTORY - THIS SHEET

LOS CERRITOS CHANNEL

HUNON

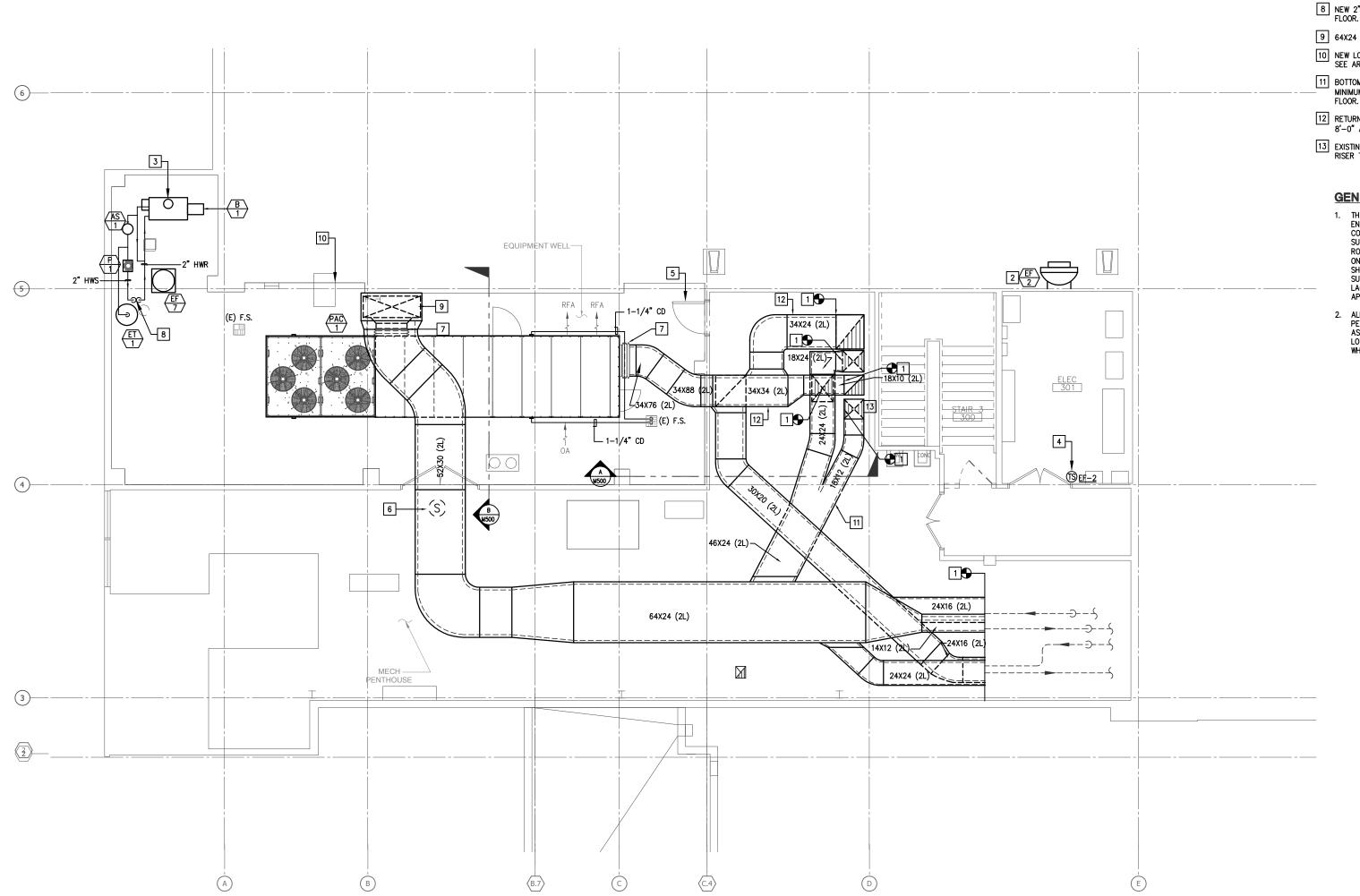
H

# BUILDING 1-MECHANICAL ROOF PLAN



RECORD DRAWING

M204A

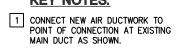


### **KEY NOTES:**

- 5 NEW DOOR. SEE ARCH. DWG.
- 6 NEW DUCT SMOKE DETECTOR. FURNISHED AND WRED BY DIVISION 16 AND INSTALLED BY DIVISION 15.
- 8 NEW 2" HWS/R DOWN TO SECOND FLOOR.
- 9 64X24 (2L) DUCT DROP.
- 11 BOTTOM OF LOWER DUCT TO BE MINIMUM 7'-0" ABOVE FINISHED FLOOR.
- EXISTING 22X22 UNINSULATED DUCT RISER TO BE INSULATED.

- THE CONTRACTOR SHALL
   ENGINEER AND PROVIDE
   COMPLETE DUCT AND PIPE
   SUPPORTS AND STANCHIONS ON SHOP DRAWINGS. SUBMIT SUPPORT DETAILS AND LACATIONS FOR REVIEW AND APPROVAL.
- ALL NEW DUCTS INSIDE
  PENTHOUSE SHALL BE INSTALLED
  AS HIGH AS POSSIBLE BUT NOT
  LOWER THAN THE ELEVATION
  WHERE AS INDICATED.





2 SEE BALANCE AND REFURBISHMENT REQUIREMENTS ON DWG. M204A.

3 NEW 6" BOILER FLUE EXTENDED 3' ABOVE THE HIGH WALL PARAPET.

4 NEW TEMPERATURE SENSOR.

7 FULL DUCT CONNECTION TO UNIT, 34X76 OPENING WITH FLEXIBLE DUCT CONNECTOR.

10 NEW LOCATION OF EXISTING LADDER. SEE ARCH. DWG.

12 RETURN AIR DUCT TO BE MINIMUM 8'-0" ABOVE FINISHED FLOOR.

### **GENERAL NOTES:**

ROOF (EQUIPMENT WELL) BASED ON CONTRACTOR COORDINATED



# LONG BEACH **CITY COLLEGE**

4900 CONANT STREET, LONG BEACH, CALIFORNIA 90808

ONG BEACH CITY COLLEGE

UILDING " O " ECORD DRAWING

045-002-00

K.

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1668

TRUCTURAL nglekirk & Sabol

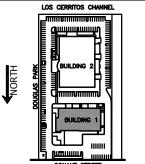
(310) 536-7676

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY
RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

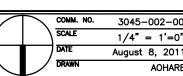
ME-ENGINEERS DATE: 08-08-2011

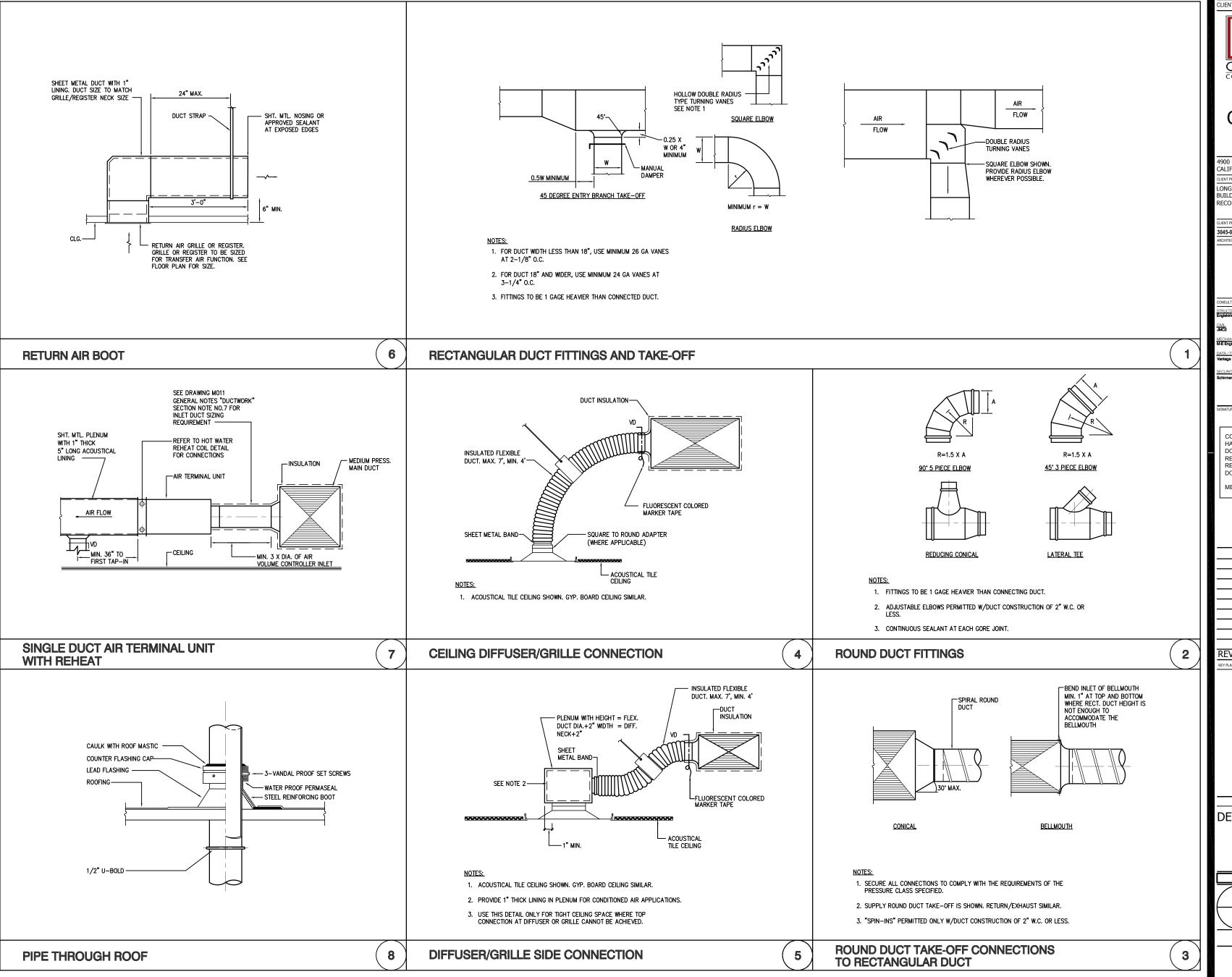
08.08.2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET



BUILDING 1-ENLARGED MECHANICAL ROOF PLAN





900 CONANT STREET, LONG BEACH, ALIFORNIA 90808

ONG BEACH CITY COLLEGE

UILDING " O " RECORD DRAWING

45-002-00

Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067 Telephone 310.557.7600 Facsimile 310.553.1

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

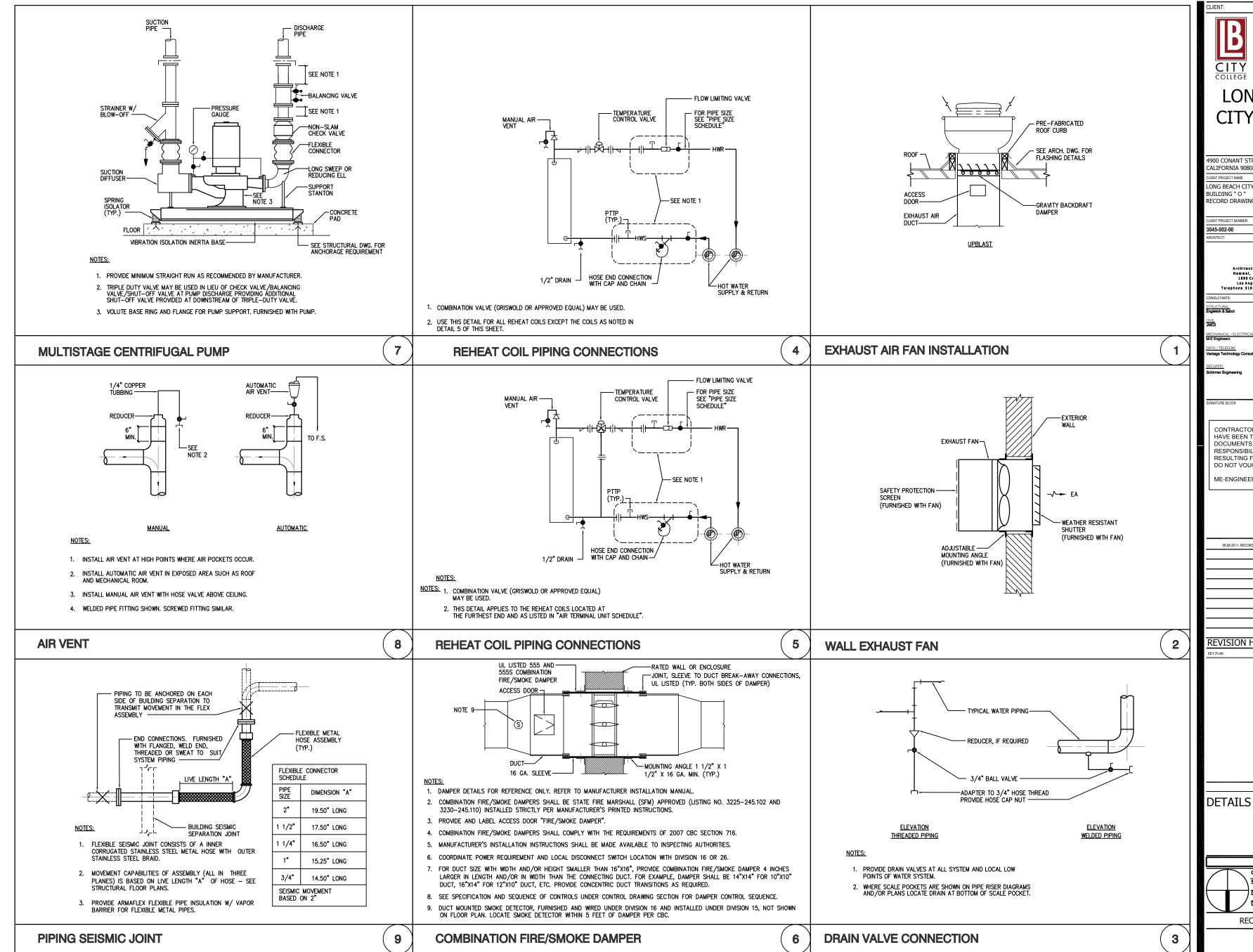
ME-ENGINEERS DATE: 08-08-2011

REVISION HISTORY - THIS SHEET

**DETAILS** 

COMM. NO. 3045-002-00 N.T.S August 8, 2011

RECORD DRAWING



900 CONANT STREET, LONG BEACH, ALIFORNIA 90808

ONG BEACH CITY COLLEGE

UILDING " O

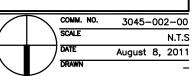
15-002-00

CONTRACTOR'S RECORDED CHANGES AVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

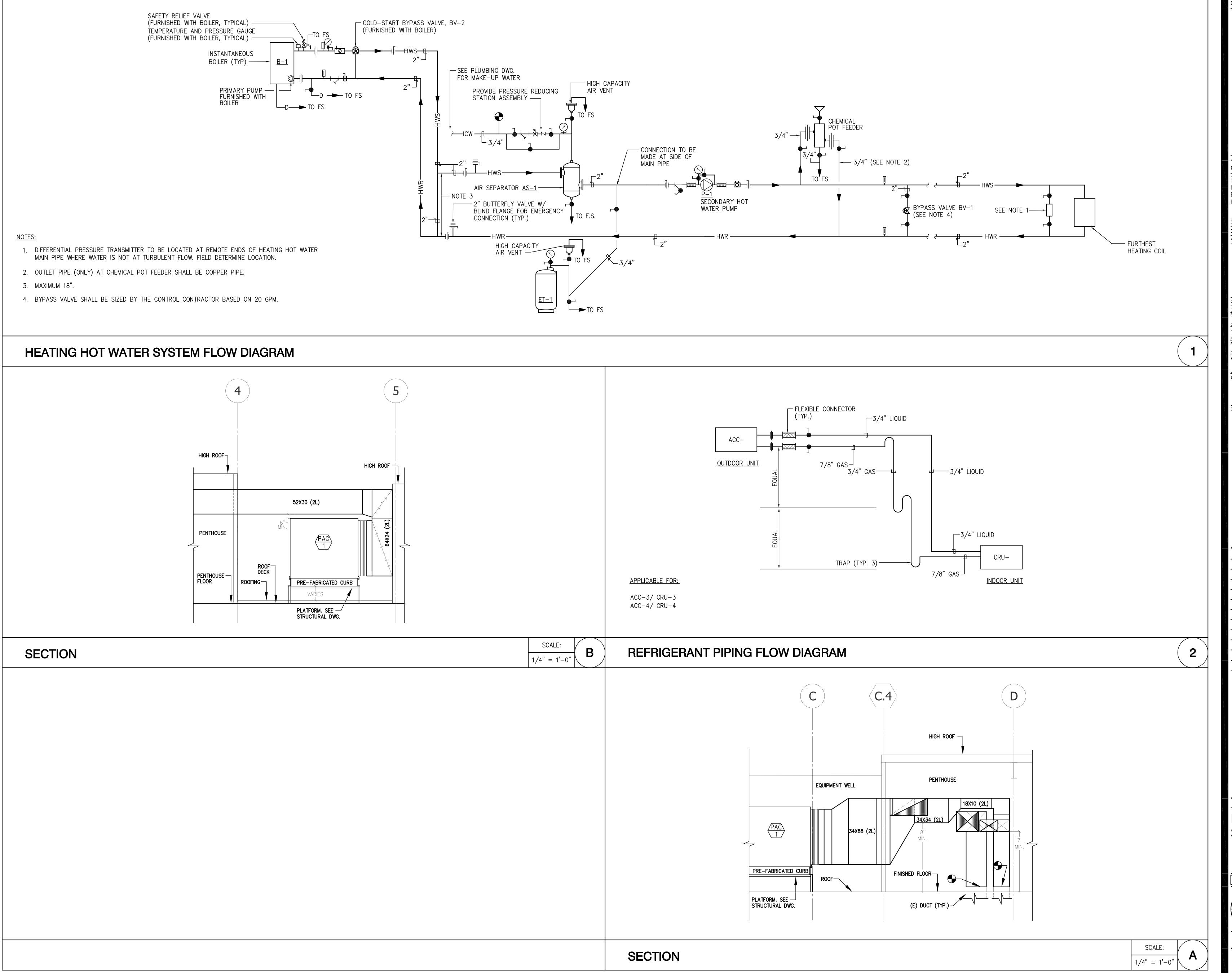
08.08.2011- RECORD DRAWING

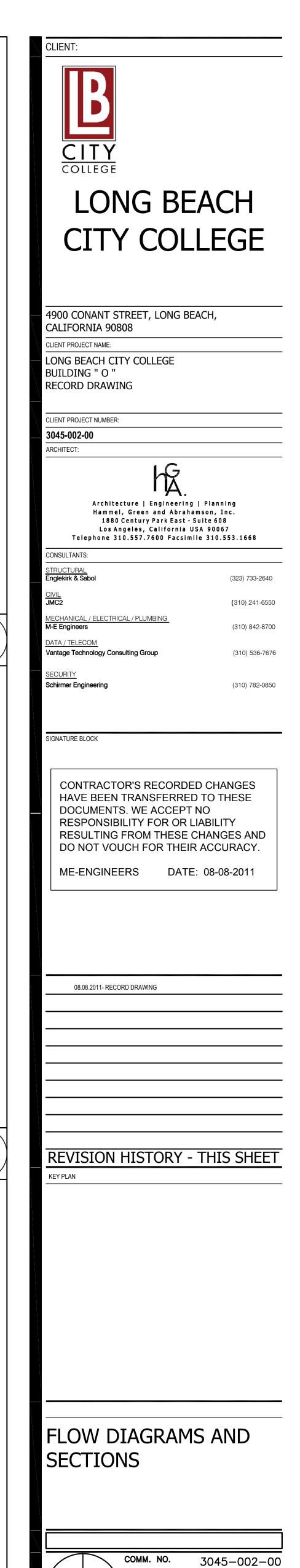
REVISION HISTORY - THIS SHEET

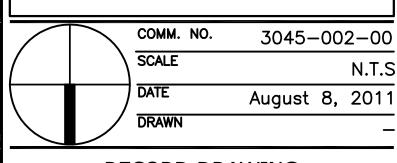


RECORD DRAWING

M301

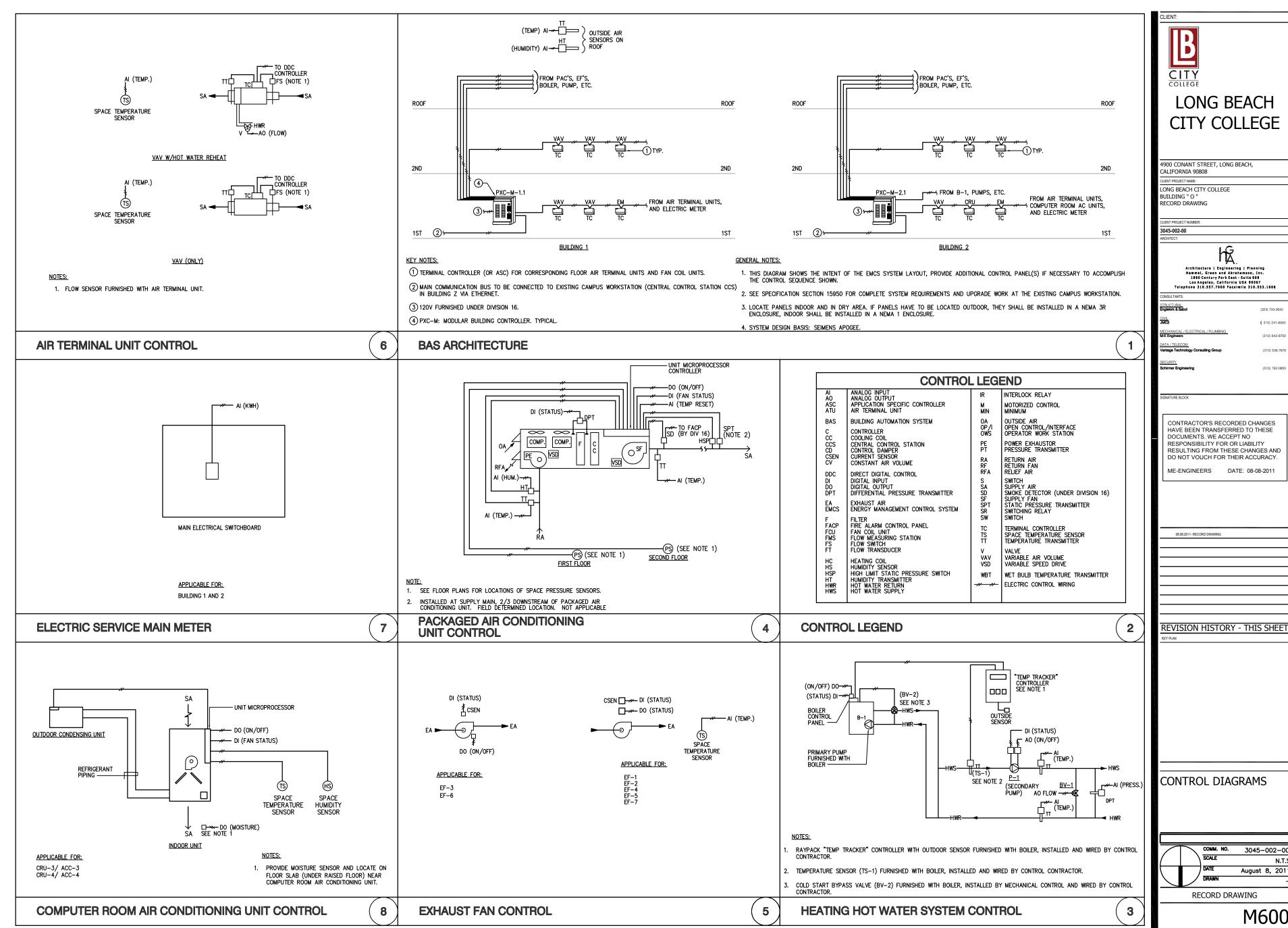






RECORD DRAWING

M500



C COPYRIGHT HAMMEL GREEN AND ABRAHAMSON, INC.

RECORD DRAWING

3045-002-00

August 8, 2011

M600

N.T.S

- 4. COOLING MODE (WITH ECONOMIZER):
- A. WHEN THE OUTDOOR AMBIENT TEMPERATURE IS ABOVE THE RETURN AIR TEMPERATURE (75°F) AND THE SPACE TEMPERATURE SENSOR CALLS FOR COOLING, THE FOLLOWING (1) THE OUTSIDE AIR DAMPERS SHALL OPEN TO THE MINIMUM POSITION.
- (2) COMPRESSOR No.1 AND CONDENSER FAN SHALL START TO OPERATE. B. APPLICABLE FOR UNIT WITH MULTIPLE COMPRESSORS, WHEN THE SPACE TEMPERATURE SENSOR CONTINUES TO CALL FOR COOLING, COMPRESSOR SHALL START TO OPERATE.
- C. WHEN THE OUTDOOR AMBIENT TEMPERATURE IS BELOW THE RETURN AIR TEMPERATURE (75°F) AND THE SPACE TEMPERATURE SENSOR CALLS FOR COOLING, THE FOLLOWING
- (1) THE ECONOMIZER SHALL ACT AS THE FIRST STAGE OF COOLING, AND MODULATE THE OUTSIDE AIR DAMPERS TO FULL OPEN POSITION TO PROVIDE FREE COOLING WITH OUTDOOR AIR.
- (2) WHEN THE ECONOMIZER IS ON AND THE SPACE TEMPERATURE SENSOR STILL CALLS FOR COOLING, COMPRESSOR No.1 SHALL START TO PROVIDE MECHANICAL COOLING.
- (3) AS THE SPACE TEMPERATURE SENSOR CONTINUES TO CALL FOR COOLING MODE, COMPRESSORS SHALL START TO OPERATE.
- (4) WHEN THE SPACE TEMPERATURE SENSOR SATISFIED WITH THE THERMOSTAT COOLING SET POINT, THE MECHANICAL COOLING STAGE SHALL STEP DOWN, OR CYCLE OFF. AFTER MECHANICAL COOLING SHUTS OFF, THE ECONOMIZER SHALL REMAIN AT THE MAXIMUM OPEN POSITION UNTIL THE OUTDOOR AMBIENT TEMPERATURE IS ABOVE THE RETURN AIR TEMPERATURE.

# H. AIR TERMINAL UNITS:

- VARIABLE AIR VOLUME WITH HOT WATER REHEAT (VAV): THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE UNIT'S CONTROL DAMPER AND REHEAT COIL CONTROL VALVE IN SEQUENCE TO MAINTAIN A DESIRED SPACE TEMPERATURE. AS THE COOLING LOAD DECREASES, THE AIR VOLUME DAMPER SHALL MODULATE CLOSED TO A MINIMUM PRESET POSITION. AS THE COOLING LOAD CONTINUE TO DECREASE, THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE HOT WATER REHEAT COIL CONTROL VALVE TO MAINTAIN THE SET SPACE TEMPERATURE (72°F).
- 2. VARIABLE AIR VOLUME (VAV): THE SPACE TEMPERATURE SENSOR SHALL MODULATE THE UNIT'S CONTROL DAMPER TO MAINTAIN THE SET ROOM TEMPERATURE (72°F).
- 3. PROVIDE SUPPLE AIRFLOW (CFM) AND TEMPERATURE READING AT CCS.

# J. EXHAUST FANS:

- 1. ALL FANS SHALL BE STARTED, STOPPED AND MONITORED AT THE CCS BASED ON USER'S DEFINED SCHEDULE, UNLESS OTHERWISE NOTED.
- 2. FAN INTERLOCK: THROUGH SOFTWARE PROGRAMMING PROVIDE FAN INTERLOCK PER THE

## EXHAUST FAN EF-3, EF-6

FOLLOWING TABLE:

AIR HANDLING UNIT

3. FOR EF-1, 2, 4, 5 AND 7: THE EXHAUST FAN SHALL BE TURNED ON AND OFF BASED ON THE CORRESPONDING SPACE TEMPERATURE SENSOR. WHEN THE SPACE TEMPERATURE IS ABOVE 85°F. THE FAN SHALL BE ON UNTIL THE SPACE TEMPERATURE DROPS BELOW 80°F.

# I. COMPUTER ROOM AIR CONDITIONING UNITS:

- 1. THE OUTDOOR CONDENSING UNIT AND INDOOR UNIT SHALL BE STARTED, STOPPED AND MONITORED BY CCS.
- 2. WHEN THE ROOM TEMPERATURE, SENSED BY THE ROOM TEMPERATURE SENSOR, IS AT 72°F OR ABOVE. THE FOLLOWING SHALL HAPPEN:
- A. THE COMPRESSOR AND CONDENSER FAN IN THE OUTDOOR UNIT SHALL OPERATE. B. THE SUPPLY AIR FAN IN THE INDOOR UNIT SHALL BE ON.
- 3. WHEN THE ROOM TEMPERATURE DROPS BELOW 68°F, THE UNITS SHALL SHUT OFF.
- 4. WHEN THE INDOOR UNIT IS IN OPERATION, THE SPACE HUMIDITY SENSOR SHALL SEND SIGNAL TO THE UNIT CONTROLLER TO MODULATE THE HUMIDIFIER TO MAINTAIN THE SPACE RELATIVE HUMIDITY SET POINT (45% RH).

# 4. ALARM AND MONITORING POINTS:

- A. IN ADDITION TO MONITORING ALARMS SPECIFIED ELSEWHERE, PROVIDE THE FOLLOWING ADDITIONAL ALARM AND MONITORING POINTS AT THE C.C.S, INCLUDING METERING DEVICES AT EACH EQUIPMENT AND PIPE LINE:
- 1. HIGH-LOW ALARMS FOR ALL ANALOG SENSING POINTS. ALL ALARM SET POINTS SHALL BE ADJUSTABLE
- 2. FAIL TO START/FAIL TO STOP ALARMS FOR ALL START/STOP POINTS.
- 3. BUILDING 1 AND BUILDING 2 ELECTRICITY CONSUMPTIONS.
- 4. MOISTURE SENSORS UNDER RAISED FLOOR NEAR COMPUTER ROOM AIR CONDITIONING UNITS.

# 5. EARLY MORNING PULL—DOWN CYCLE CONTROL:

- PULL-DOWN CYCLE OCCURS IF THE SPACE IS OVERHEATED AND SPACE NEEDS TO BE COOLED RAPIDLY TO BE READY FOR OCCUPANCY IN A SHORT DURATION.
- A) IF THE OPTIMAL START/STOP PROGRAM HAS DETERMINED THAT THE SYSTEM STARTUP SHALL BE IN PULL-DOWN MODE AFTER PAC-1 HAS STARTED, THE FOLLOWING SHALL
- (1) PAC-1 SHALL BE STARTED.
- (2) ECONOMIZER DAMPERS SHALL BE POSITIONED TO 100% RECIRCULATION
- (3) PAC-1 DISCHARGE TEMPERATURE CONTROLLERS SHALL BE RESET TO THE DESIGN DAY DISCHARGE AIR COOLING TEMPERATURE SET POINT. DISCHARGE AIR RESET SIGNALS FROM THE SPACE TEMPERATURE SENSORS SHALL BE
- (4) FAN TRACKING AND DUCT STATIC PRESSURE CONTROLS SHALL BE ACTIVE.
- (5) ALL ZONES SHALL BE UNDER THE CONTROL OF THEIR RESPECTIVE ZONE THERMOSTATS. ZONE TEMPERATURE SENSORS SET POINTS SHALL BE DEPRESSED TO 73°F.
- B) PULL-DOWN MODE SHALL CONTINUE TO OPERATE UNTIL AVERAGE RETURN AIR TEMPERATURE DROPS TO 73°F± OR A PRESET LOW LIMIT, OR UNTIL THE OPTIMAL START/STOP PROGRAM DETERMINES TO TERMINATE THE CYCLE AND GO TO NORMAL
- C) AT THE END OF EARLY MORNING PULL-DOWN CYCLE, THE SYSTEM SHALL GO TO NORMAL PRE-OCCUPANCY PURGE MODE AS FOLLOWS:
  - (1) ECONOMIZER CONTROLS SHALL BE REACTIVATED AND DAMPERS PLACED UNDER THE CONTROL OF THE ECONOMIZER CONTROL. OUTSIDE AIR DAMPERS SHALL OPEN.
  - (2) SUPPLY TO RETURN DIFFERENTIAL SHALL BE RESET TO NORMAL DIFFERENTIAL.
  - (3) DISCHARGE DUCT TEMPERATURE SET POINTS SHALL GO TO NORMAL WITH RESET SIGNALS ACTIVE. THERMOSTAT SET POINTS SHALL BE RESET TO NORMAL.
- (4) ALL OTHER CONTROL LOOPS ASSOCIATED WITH THE SYSTEM SHALL BE ACTIVE AND ALL LOCKOUTS REMOVED.

# 6. PRE-OCCUPANCY PURGE VENTILATION CYCLE CONTROL:

- THIS MODE OF OPERATION OCCURS FOR ALL SYSTEMS, BEFORE THE SYSTEMS GO INTO NORMAL OCCUPANCY MODE, WHEN THE SYSTEM START-UP WAS IN EITHER WARM-UP MODE OR PULL-DOWN MODE. THIS CYCLE IS REQUIRED FOR CALIFORNIA TITLE 24 ENERGY CONSERVATION CODE COMPLIANCE.
- A) PURGE VENTILATION MODE SHALL BE ONE OF THE FOLLOWING:
  - (1) NORMAL OPERATION OF THE SYSTEMS WITH CODE MINIMUM VENTILATION FOR ONE HOUR BEFORE OCCUPANCY.
- (2) OPERATION OF SYSTEMS IN ECONOMIZER MODE WITH 100 OUTDOOR OR MIX OF OUTDOOR AND RETURN AIR FOR A DURATION ADEQUATE TO SUPPLY OUTDOOR VENTILATION AIR EQUAL TO THREE AIR CHANGES IN THE SPACE, SERVED BY THE
- B) IF THE SYSTEM WAS STARTED IN THE FLUSH-OUT MODE AND THE FLUSH-OUT MODE DURATION WAS ADEQUATE TO PROVIDE THREE COMPLETE OUTDOOR VENTILATION AIR CHANGES, AT THE END OF THE FLUSH-OUT MODE, THE SYSTEM MAY GO DIRECTLY TO NORMAL OPERATING MODE.
- C) THE PRE-OCCUPANCY PURGE VENTILATION CYCLE SIMPLY ADDS A MAXIMUM OF ONE HOUR TO THE SYSTEM OPERATION DURING STARTUP. AS FOLLOWS:
- (1) IF THE SYSTEM STARTUP IS IN WARM-UP OR PULL-DOWN MODE. ALLOW ONE HOUR OR LESS OF NORMAL OPERATION OF THE SYSTEM IN MINIMUM VENTILATION OR ECONOMIZER MODE AFTER THE WARM-UP OR PULL-DOWN CYCLE IS COMPLETE AND BEFORE THE SPACE IS OCCUPIED.
- (2) IF THE SYSTEM STARTUP IS IN FLUSH-OUT CYCLE, ALLOW ADEQUATE DURATION OF THE SYSTEM OPERATION IN MINIMUM VENTILATION OR ECONOMIZER MODE SO THAT THE TOTAL DURATION OF FLUSH-OUT CYCLE AND PURGE CYCLE IS ONE HOUR ADEQUATE TO AFFECT OUTDOOR AIR VENTILATION EQUAL TO THREE AIR CHANGES.
- 7. NORMAL OPERATING MODE CONTROLS: (ALSO REFER TO INDIVIDUAL SYSTEM SEQUENCE OF OPERATION.)
- A) WHEN THE SYSTEM GOES INTO NORMAL OPERATING MODE, THE FOLLOWING SHALL OCCUR:
- (1) COOLING CONTROL SHALL BE ACTIVE. COOLING RESET CONTROLS SHALL BE ACTIVE.
- (2) SUPPLY TO RETURN DIFFERENTIAL AT FAN TRACKING CONTROL SHALL BE NORMAL. AND EQUAL TO THE TOTAL EXHAUST FROM THE BUILDING PLUS PRESSURIZATION REQUIREMENT.
- (3) DUCT STATIC PRESSURE CONTROL SHALL BE ACTIVE.
- (4) FAN TRACKING CONTROL SHALL BE ACTIVE
- (5) ECONOMIZER CONTROLS SHALL BE ACTIVE.
- (6) HEATING CONTROLS SHALL BE ACTIVE. HEATING RESET CONTROLS SHALL BE ACTIVE.

# 8. SUPPLY DUCT STATIC PRESSURE CONTROL:

- A) SUPPLY DUCT STATIC PRESSURE CONTROL SHALL INCLUDE THE FOLLOWING:
- (1) THE STATIC PRESSURE SENSOR LOCATED AT THE REMOTE END OF THE MAIN SUPPLY AIR DUCT (THE SENSOR LOCATION SHALL BE DETERMINED BY THE CONTROL CONTRACTOR) SHALL SEND A SIGNAL TO THE DDC CONTROLLER.
- (2) THE DDC SYSTEM SELECTED THE LOWEST DIFFERENTIAL PRESSURE READING AND CONTROLS THE FAN SPEED TO MAINTAIN THE REQUIRED MINIMUM DIFFERENTIAL PRESSURE.
- (3) THE STATIC PRESSURE CONTROLLER SET POINT SHALL BE RESET BY THE ZONE TERMINAL UNIT CONTROLLERS SENSING THE STATIC PRESSURE AT THE TERMINAL UNIT SUCH THAT THE SET POINT OF THE MAIN STATIC PRESSURE CONTROLLER IS JUST ADEQUATE TO MEET THE STATIC PRESSURE REQUIREMENTS AT THE TERMINAL UNITS.
- (4) THE HIGH LIMIT DISCHARGE STATIC PRESSURE SENSOR AT THE SUPPLY AIR DUCT SHALL STOP THE SUPPLY AIR FAN(S) WHEN THE PRESSURE IN THE SUPPLY AIR DUCT EXCEEDS ITS SETTING. (4.5" W.C.).

# 9. SPACE STATIC PRESSURE CONTROL:

- A) THE TWO SPACE PRESSURE SENSORS (ONE LOCATED ON FIRST FLOOR AND THE OTHER LOCATED ON SECOND FLOOR) SHALL SEND SIGNALS TO PAC-1 UNIT CONTROLLER TO MAINTAIN THE SET POINT OF +0.05" W.C. BY MODULATING THE PAC-1 POWER EXHAUST FAN.
- G. PACKAGED AIR CONDITIONING UNITS (APPLICABLE FOR PAC-1 ):
- 1. UNITS SHALL BE STARTED, STOPPED, AND MONITORED BY THE CCS BASED ON USER'S DEFINED SCHEDULE, UNLESS OTHERWISE NOTED.
- 2. WHEN THE UNIT IS STARTED, THE INDOOR FAN AND POWER EXHAUST FAN SHALL OPERATE CONTINUOUSLY.
- 3. COOLING MODE: THE RETURN AIR TEMPERATURE SENSOR IN THE RETURN AIR DUCT SHALL CONTROL THE COMPRESSOR AND CONDENSER TO PRODUCE

- (3) THE PERVIOUS DAY WAS A WEEKEND DAY (SUNDAY) AND THE HVAC SYSTEM WERE OF FOR TWO DAYS.
- (4) THE PERVIOUS DAY WAS A LONG WEEKEND AND THE HVAC SYSTEM WERE DOWN FOR THREE OR MORE DAYS.
- (5) BASED ON THE HISTORICAL DATA, (I.E., OUTDOOR TEMPERATURES, OUTDOOR SOL-AIR TEMPERATURES, DAY OF THE WEEK, NUMBER OF DAYS THE HVAC SYSTEM WAS OFF ON THE PREVIOUS DAYS AND THE REAL-TIME OUTDOOR TEMPERATURE, SOL-AIR TEMPERATURE AND OUTDOOR HUMIDITY), THE SYSTEM SHALL ESTIMATE THE TIME REQUIRED (INCLUDING THE PRE-OCCUPANCY PURGE VENTILATION CYCLE DURATION) TO BRING OCCUPIED SPACE TO THE DESIRED TEMPERATURE AT THE SCHEDULED OCCUPANCY TIME, EITHER IN NORMAL OPERATING MODE, WARM-UP MODE, FLUSH-OUT MODE OR PULL-DOWN MODE, OR A COMBINATION OF MODES. THE SYSTEM SHALL ADD A SET DURATION OF SYSTEM OPERATION (ADJUSTABLE) AS A SAFETY FACTOR AND START THE SYSTEMS IN APPROPRIATE MODE AT THE OPTIMAL START TIME. THE SYSTEM SHALL MONITOR THE RETURN AIR TEMPERATURES AND SPACE TEMPERATURES AT REGULAR INTERVALS AND DETERMINE THE ACTUAL DURATION REQUIRED TO BRING THE OCCUPIED SPACE TO THE DESIRED TEMPERATURE AND COMPARE THIS DURATION TO THE CALCULATED DURATION. THIS INFORMATION SHALL BE STORED FOR ANALYSIS BY THE BUILDING OPERATOR SO THAT THE OPTIMAL START PROGRAM TIME CONSTANTS AND SAFETY FACTORS CAN BE ADJUSTED UNTIL A TRUE OPTIMAL START PROGRAM MATRIX IS IN PLACE.

## 3. EARLY MORNING WARM-UP CONTROL:

- A) IF THE OPTIMAL START/STOP PROGRAM HAS DETERMINED THAT THE SYSTEM STARTUP SHALL BE IN WARM-UP MODE FOR THE APPLICABLE SYSTEM, AFTER THE SUPPLY FAN FOR THE APPLICABLE SYSTEM HAS STARTED, THE FOLLOWING SHALL OCCUR:
- (1) THE ECONOMIZER SYSTEM EXHAUST AND OUTSIDE AIR DAMPERS SHALL BE VERIFIED TO BE CLOSED AND THE RETURN DAMPER VERIFIED TO BE 100% OPEN, VIA THE DAMPER POSITION SIGNALS. DAMPER AND SWITCHES NOT REQUIRED.
- (2) LOCK OUT THE COOLING CONTROL. DEACTIVATE DUCT DISCHARGE TEMPERATURE CONTROLLER AND ECONOMIZER CONTROL FOR ALL THE SYSTEMS. HOT WATER CONTROL VALVES SHALL BE ACTIVE.
- (3) RESET DISCHARGE DUCT TEMPERATURE CORRESPONDING TO DESIRED DUCT TEMPERATURE CORRESPONDING TO DESIGN (SET AT 90°F INITIALLY FOR CONSTANT VOLUME SYSTEM AND 75°± INITIALLY FOR VAV SYSTEM, ADJUSTABLE). DO NOT ACTIVATE DISCHARGE TEMPERATURE CONTROLLER YET.
- (4) COMMAND ALL ZONE VAV TERMINALS WITH HOT WATER RE-HEAT COILS TO DESIGN HEATING CFM POSITION.
- B) AFTER ALL OF THE ABOVE ARE COMPLETE, THE FOLLOWING SHALL OCCUR:
- (1) HEATING HOT WATER SYSTEM SHALL BE STARTED (IF OFF).
- (2) THE SUPPLY SYSTEM STATIC PRESSURE CONTROL SHALL BE ACTIVATED. (SEE DUCT PRESSURE CONTROL SHALL.
- C) WHEN THE AVERAGE RETURN AIR TEMPERATURE AT THE PAC-1 EQUALS THE FOLLOWING, THE WARM-UP CYCLE SHALL BE TERMINATED AND SYSTEM SHALL GO TO PRE- OCCUPANCY PURGE MODE.
- (1) REAL—TIME OUTDOOR TEMPERATURE = 40°F OR LOWER, AVERAGE RETURN AIR TEMPERATURE 74°F.
- (2) REAL-TIME OUTDOOR TEMPERATURE = 60°F OR HIGHER, AVERAGE RETURN AIR TEMPERATURE 72°F.
- (3) FOR INTERMEDIATE OUTDOOR TEMPERATURES, INTERPOLATE ON LINEAR SCALE.
- (4) AT INDIVIDUAL INTRIOT AND PERIMETER ZONES WHEN THE ZONE TEMPERATURE SENSOR SENSES THE ABOVE TEMPERATURES, THE ZONE TERMINAL SHALL GO INTO ITS NORMAL CONTROL MODE AND BE CONTROLLED BY THE ZONE THERMOSTAT ONLY.
- D) AT THE END OF THE WARM-UP CYCLE. THE SYSTEM SHALL GO TO PRE-OCCUPANCY PURGE MODE IN A CONTROLLED MANNER.
- (1) THE MINIMUM OUTDOOR AIR DAMPER SHALL OPEN.
- (2) PAC-1 STATIC PRESSURE CONTROL SHALL BE DEACTIVATED AND SUPPLY FANS AND RELIEF FANS RESET TO MINIMUM SPEED. NEXT, THE SUPPLY TO RETURN DIFFERENTIAL AT THE TRACKING CONTROL FOR THE SYSTEMS SHALL BE RESET TO NORMAL. NEXT, THE INTERIOR ZONE AND PERIMETER ZONE VAV TERMINAL UNITS SHALL BE PLACED BACK UNDER THE CONTROL OF ZONE THERMOSTATS. NEXT, THE ECONOMIZER CONTROL, NORMAL SET POINT OF DISCHARGE DUCT TEMPERATURE CONTROL AND COOLING CONTROL MODE AND HEATING CONTROL VALVES SHALL BE ACTIVATED.
- (3) AFTER A SET TIME DELAY (3 TO 5 MINUTES ADJUSTABLE) AND VERIFICATION OF ALL CONTROL LOOPS REACTIVATION. THE SUPPLY DUCT STATIC PRESSURE CONTROLLER FOR THE SYSTEMS IS REACTIVATED AND THE FANS PERMITTED TO OPERATE AS NEEDED TO MAINTAIN DUCT STATIC PRESSURE.

# 4. EARLY MORNING FLUSH-OUT CONTROL:

- FLUSH OUT MODE OCCURS WHEN THE SPACE TEMPERATURE IS EXCESSIVE AND OUTDOOR AIR IS COOL AND CAN BE USED TO FLUSH OUT STORED HEAT BEFORE GOING INTO MECHANICAL COOLING MODE (NORMAL OR PRE-OCCUPANCY PURGE).
- A) IF THE OPTIMAL START/STOP PROGRAM HAS DETERMINED THAT THE SYSTEM START UP SHALL BE IN THE FLUSH-OUT MODE AFTER ALL THE FANS HAVE STARTED, THE FOLLOWING SHALL OCCUR:
- (1) ECONOMIZER DAMPERS SHALL BE POSITIONED FOR 100% OUTDOOR AIR SUPPLY TO THE BUILDING. RETURN AIR DAMPER SHALL CLOSE AND EXHAUST AND OUTDOOR AIR DAMPERS SHALL GO TO 100% OPEN POSITION. ECONOMIZER CONTROLS SHALL BE DEACTIVATED.
- (2) PAC-1 DISCHARGE DUCT TEMPERATURE CONTROLLERS SHALL BE DEACTIVATED. COOLING MODE SHALL BE LOCKED OUT.
- (3) ALL ZONES SHALL BE ACTIVE UNDER THE CONTROL OF THEIR RESPECTIVE TEMPERATURE SENSORS.
- (4) THE FAN TRACKING AND DUCT STATIC PRESSURE CONTROLLERS SHALL BE ACTIVATED IN THEIR NORMAL OPERATING MODE.
- B) FLUSH-OUT MODE SHALL CONTINUE TO OPERATE UNTIL THE AVERAGE RETURN AIR TEMPERATURE DROPS TO 73°F± OR UNTIL THE OPTIMAL START PROGRAM DETERMINES TO SWITCH TO NORMAL MODE OR PRE-OCCUPANCY PURGE MODE BASED ON THE NEED TO BRING THE OCCUPIED SPACE TO THE DESIRED TEMPERATURE AT THE NORMAL OCCUPANCY TIME.
- C) AT THE END OF THE FLUSH-OUT CYCLE, THE SYSTEM SHALL GO TO NORMAL MODE OR PRE-OCCUPANCY PURGE MODE AS FOLLOWS:
- (1) ECONOMIZER CONTROLS SHALL BE ACTIVATED AND ECONOMIZER DAMPERS PLACED UNDER THE CONTROL OF ECONOMIZER CONTROLS.
- MODE AND HOT WATER SYSTEM SHALL BE GIVEN SIGNAL TO START AS REQUIRED.

(2) DISCHARGE DUCT TEMPERATURE CONTROLS SHALL BE ACTIVATED. THE COOLING

(3) AFTER THE FLUSH-OUT MODE, SYSTEMS SHALL NOT GO TO PULL-DOWN MODE.

# . GENERAL NOTES:

- A. PROVIDE ALL NECESSARY HARDWARE AND SOFTWARE INCLUDING, BUT NOT LIMITED TO, CONTACTS, SENSORS, DEVICES, INSTRUMENTATION, WIRING AND CONDUITS TO ACCOMPLISH THE FOLLOWING CONTROLS AND CONTROL SEQUENCE FOR THE ENTIRE HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS FOR BOTH BUILDING 1 AND BUILDING 2, UNLESS OTHERWISE NOTED ON THE DRAWINGS AND SPECIFIED ELSEWHERE.
- B. ALL CONTROL SET POINTS SHALL BE ADJUSTABLE.
- C. CONTROLS SHALL BE DIRECT DIGITAL CONTROL (DDC), UNLESS OTHERWISE NOTED. ACTUATORS FOR VALVES, DAMPERS AND TERMINAL CONTROLLERS SHALL BE ELECTRIC/ELECTRONIC CONTROL. REMOVE ALL EXISTING ACTUATORS FOR VALVES AND DAMPERS IN BUILDING 2 AND REPLACE WITH NEW ELECTRIC/ELECTRONIC ACTUATORS.
- D. ALL PUMPS AND FANS OPERATIONS (STATUS) SHALL BE MONITORED BY THE EXISTING WORKSTATION (CENTAL CONTROL STATION) LOCATED IN BUILDING Z.
- E. ALL FANS AND PUMPS STATUS SHALL BE MONITORED BY THE CORRESPONDING CURRENT SENSORS OR DIFFERENTIAL PRESSURE TRANSMITTERS.
- F. MOTOR STARTER WIRING DIAGRAMS AND TYPICAL CONNECTIONS FOR CONTROL WIRING SCHEMES ARE COVERED IN DIVISION 16 CONTRACT DOCUMENT. MOTOR CONTROL OPERATIONS REQUIRED UNDER DIVISION 15 SHALL BE COORDINATED WITH DIVISION 16 WORK TO ENSURE A COMPLETE AND FUNCTIONAL INSTALLATION.
- G. PROVIDE TIME DELAY PROGRAM FOR ALL FAN AND PUMP MOTORS AND EQUIPMENT THAT SHALL BE BROUGHT ON-LINE ONE AT A TIME AFTER POWER FAILURE TO PREVENT POWER SURGE.
- H. ALL MOTORIZED ACTUATORS LOCATED OUTDOORS SHALL BE RATED FOR OUTDOOR APPLICATION OR PROTECTED WITH A WEATHER COVER.

I. ALL HVAC EQUIPMENT, INCLUDING AIR TERMINAL UNITS, IN BUILDING 2 SHALL BE CONVERTED TO DDC (IF THEY ARE NOT DDC) AND CONNECTED TO BAS. THE EQUIPMENT CONTROL SEQUENCE SHALL BE PER THE ORIGINAL DESIGN PACKAGE BY P2S ENGINEERING DRAWING M4.1 (SEE ATTACHED IN THIS PACKAGE FOR REFERENCE) DATED 02/07/01. THE FOLLOWING CONTROL SEQUENCE IS FOR BUILDING 1 HVAC EQUIPMENT.

# 2. HEATING HOT WATER SYSTEM:

- A. HEATING HOT WATER BOILER CONTROL CIRCUIT SHALL BE ENERGIZED AND DE-ENERGIZED FROM THE CCS BASED ON USER'S DEFINED SCHEDULE.
- B. THE DDC PANEL SHALL START THE BOILER AND PUMPS WHEN ANY HEATING HOT WATER VALVE CALLS FOR SERVICE WITHIN THE USER'S DEFINED SCHEDULE.
- C. PROVIDE SYSTEM HOT WATER SUPPLY AND RETURN TEMPERATURE AT THE DDC PANEL.
- D. BOILER CONTROL:
- THE DDC PANEL SHALL CONTROL THE BOILER FIRING AND THE PRIMARY AND SECONDARY PUMPS BASED ON RETURN WATER TEMPERATURE TO SATISFY THE HOT WATER SUPPLY TEMPERATURE TO THE BUILDING.
- 2. ON BOILER SHUT DOWN, ALLOW THE PRIMARY PUMP TO OPERATE FOR 5 MINUTES AFTER THE SHUT DOWN OF THE BOILER.
- 3. ON BOILER START UP, THE PRIMARY PUMP SHALL START PRIOR TO THE BOILER. THE " COLD WATER START PACKAGE" CONSISTS OF THE "TEMP TRACKER" CONTROLLER, TEMPERATURE SENSOR TS-1 AND THE BYPASS VALVE BV-2 SHALL BE IN-ACTIVE TO CONTROL THE BOILER AND THE PRIMARY PUMP TO PROVIDE WATER WARM UP CYCLE PER MANUFACTURER'S PRINTED CONTROL SEQUENCE ON COLD START.
- SECONDARY PUMP CONTROLS:
- 1. WHEN THE PRESSURE DIFFERENTIAL, AS SENSED BY THE REMOTE DIFFERENTIAL PRESSURE TRANSMITTERS AT THE MAIN LINES, EXCEEDS A PREDETERMINED LIMITS, A SIGNAL SHALL BE SENT TO THE DDC CONTROLLER TO MODULATE THE SYSTEM BYPASS VALVE BV-1 TO MAINTAIN THE SYSTEM PRESSURE.

# 3. HEATING, VENTILATING, AND AIR CONDITIONING SYSTEM:

- A. ALL FANS AND AIR CONDITIONING UNITS (AC) SHALL BE STARTED, STOPPED AND MONITORED AT THE CENTRAL CONTROL STATION (CCS) BASED ON USER'S DEFINED SCHEDULE ALL TEMPERATURE SENSORS, HUMIDITY SENSORS AND PRESSURE SENSORS SHALL BE MONITORED AT THE CCS, UNLESS OTHERWISE INDICATED ELSEWHERE IN THE SEQUENCE OF OPERATION. ALL FANS WITH VFD'S SHALL START AT MINIMUM SPEED. AT THE END OF THE DAY, ALL THE EXHAUST FANS SHALL BE COMMANDED TO STOP AND PAC-1 FANS SHALL GO TO MINIMUM SPEED AND THEN SHUT DOWN. ALL SYSTEMS CONTROLS SHALL SET TO UNOCCUPIED MODE...
- B. STARTING THE SUPPLY FAN FOR PAC-1 SHALL START ITS ASSOCIATED POWER EXHAUST (RELIEF FAN) FAN. OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL CLOSE WHEN SUPPLY FAN IS
- C. PROVIDE CONTROL AT THE CCS TO OVERRIDE AND TO CLOSE TEMPERATURE CONTROL VALVE
- D. SUPPLY, RELIEF AND EXHAUST FANS SHALL STOPPED WHEN THE SMOKE DETECTOR IN THE SUPPLY AIR MAIN DETECTORS SMOKE OR RECEIVED A DIRECT SIGNAL FROM THE BUILDING FIRE ALARM CONTROL PANEL. THE FANS SHALL BE SHUT DOWN BY THE BUILDING FIRE ALARM CONTROL PANEL DIRECTLY (NOT BY DDC PANEL).
- E. PROVIDE AIR FILTER ALARM AT THE CCS WHEN FILTER DIFFERENTIAL PRESSURE REACH THE FINAL SET POINT AS INDICATED IN THE EQUIPMENT SCHEDULE.
- F. AIR HANDLING SYSTEM CONTROL SEQUENCES:

FOR EACH HEATING COIL.

- 1. PAC-1 SHALL HAVE THE BASIC CONTROL SEQUENCES AS FOLLOWS:
- A) OPTIMAL START/STOP CONTROL. B) EARLY MORNING WARM-UP CONTROL.

C) EARLY MORNING FLUSH-OUT CYCLE CONTROL.

- D) EARLY MORNING PULL-DOWN CYCLE CONTROL. E) PRE-OCCUPANCY PURGE VENTILATION CYCLE CONTROL. F) NORMAL OPERATING MODE CONTROL.
- G) SUPPLY DUCT STATIC PRESSURE CONTROL. H) SPACE STATIC PRESSURE CONTROL

PULL DOWN CYCLE.

CONDITIONS, I.E.:

- 2. OPTIMAL START/STOP CONTROL: A) AIR HANDLING SYSTEMS ARE STARTED AND STOPPED THROUGH THE DIRECT DIGITAL CONTROLLER OPTIMAL START PROGRAM FOR EITHER NORMAL DAY CYCLE, EARLY MORNING WARM-UP CYCLE, EARLY MORNING FLUSH-OUT CYCLE, OR EARLY MORNING
- B) THE DDC SYSTEM SHALL MONITOR OUTDOOR AIR TEMPERATURE VIA A SENSOR LOCATED IN A SHADED AREA ON THE ROOF, OUTDOOR AIR SOL-AIR TEMPERATURE VIA A SOLAR COMPENSATED OUTDOOR AIR TEMPERATURE SENSOR LOCATED ON THE ROOF AND OUTDOOR AIR RELATIVE HUMIDITY VIA A RELATIVE HUMIDITY SENSOR LOCATED ON THE ROOF. THE CONTROL SYSTEM SHALL CALCULATE THE OUTDOOR AIR WET BULB AND DEW POINT VIA A BUILT-IN PSYCHOMETRIC CALCULATION PROGRAM WITHIN THE CONTROL SYSTEM. THE SYSTEM SHALL MONITOR THESE CONDITIONS EVERY HOUR (15 MINUTE INTERVAL PREFERRED) AND DEVELOP A HISTORICAL DATA BASE OF OUTDOOR CONDITIONS. DEPENDING UPON THE DAY OF THE WEEK, THE CONTROL SYSTEM SHALL SET UP AN INTERNAL MATRIX FOR EACH SET OF STARTUP
- (1) THE PERVIOUS DAY WAS A WORKING DAY AND THE BUILDING HVAC SYSTEM WERE FUNCTIONAL: THEREFORE, STORED HEAT OR COLD IN THE BUILDING IS MINIMAL.
- (2) THE PERVIOUS ONE DAY WAS A HOLIDAY AND THE HVAC SYSTEM WERE SHUT OFF ON THE PERVIOUS DAY, BUT OPERATED THE DAY BEFORE.

COLLEGE

# LONG BEACH CITY COLLEGE

1900 CONANT STREET, LONG BEACH, California 90808

ONG BEACH CITY COLLEGE

BUILDING " O " RECORD DRAWING

IENT PROJECT NUMBER 045-002-00

> Architecture | Engineering | Planning Hammel, Green and Abrahamson, Inc. 1880 Century Park East - Suite 608 Los Angeles, California USA 90067

Telephone 310.557.7600 Facsimile 310.553.1668

(323) 733-2640 **(**310) 241-6550 (310) 842-8700 antage Technology Consulting Group (310) 536-7676 (310) 782-0850 chirmer Engineering

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. WE ACCEPT NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS DATE: 08-08-2011

08 08 2011- RECORD DRAWING

REVISION HISTORY - THIS SHEET

CONTROL SEQUENCE

COMM. NO. 3045-002-00 N.T.S August 8, 2011 **DRAWN** 

RECORD DRAWING

\_\_\_\_

**Consulting Engineers** 

5000 East Spring Street, 8th Floor

1\PLAN CHECK/OWNER'S REVISIONS

/2\PLAN CHECK/OWNER'S REVISIONS

3 CONTRACTOR COORDINATION

4 CONTRACTOR COORDINATION

 $\overline{Z}$ 

Tel: 562 497 2999 Fax: 562 497 2990

Long Beach, CA 90815-1275

Internet: www.p2seng.com

Project Management

Telecommunications

P2S Engineering, Inc.

Mechanical

Electrical

Controls

ZS (DIGITAL) VALVE ACTUATOR SPEED INDICATION SPEED CONTROL VALVE ACTUATOR TEMPERATURE INDICATION FLOW INDICATION LEVEL INDICATION DAMPER ACTUATION MOTOR STATUS PRESSURE INDICATOR DIFFERENTIAL PRESSURE INDICATOR POSITION INDICATION ANALOG INPUT DIGITAL INPUT ANALOG OUTPUT DIGITAL OUTPUT

VOLTAGE INDICATION DPA DIFFERENTIAL PRESSURE ALARM START/STOP DAMPER ACTUATION ZS (DIGITAL) PRESSUR SENSOR PS DPS DIFFERNTIAL PRESSURE SWITCH/SENSOR PROBE TEMPERATURE SENSOR PTS FS FLOW SENSOR VELOCITY SENSOR DIFFERENTIAL PRESSURE SWITCH/SENSOR DPSA WITH RESPECT RO AMBIENT ATS AVERAGING TEMPERATURE SENSOR

CONTRACTOR'S RECORDED CHANGES HAVE BEEN TRANSFERRED TO THESE DOCUMENTS. M-E ENGINEERS INC. ACCEPTS NO RESPONSIBILITY FOR OR LIABILITY RESULTING FROM THESE CHANGES AND DO NOT VOUCH FOR THEIR ACCURACY.

ME-ENGINEERS INC.

02-07-01 DATF FOR REFERENCE

DDC POINTS LIST

& SEQUENCE OF

OPERATION

DIRECT DIGITAL CONTROLS INPUT / OUTPUT POINTS LIST Instrument Instrument
Type Number AI AO DI DO Description Notes A TYP AIR HANDLING UNIT (AHU-1 Thru 4) X Supply Fan S/S X Supply Fan Status IC X Dirty Filter Switch DP Outsid Air Temperature TI 5 X Return Air Temperature TI 6 X Zone Temperature TI B TYP SINGLE ZONE ROOF TOP UNIT (RTU-1 THRU RTU-5) x Supply Fan S/S x Supply Fan Status x Exhaust Fan Start/Stop x Exhaust Fan Status IC x Cool Stage 1 ΤI x Cool Stage 2 7 x Return Air Temperature TI 8 x Discharge air temperature TI x Compressor 1 Status IC x Compressor 2 Status IC x Dirty Filter Switch DP Dirty Filter alarm C TYP VAV ROOF TOP UNIT (RTU-6 Thru RTU-8) x Supply Fan S/S x Supply Fan Status IC x Cool Stage 1 TI x Cool Stage 2 TI 5 x Return Air Temperature TI 6 x Discharge Air Temperature ΤI x Compressor 1 Status IC x Compressor 2 Status IC 9 x Supply Fan VFD Speed SK 10 x Supply Fan VFD Feedback SI x Exhaust Fan S/S x Exhaust Fan Status 13 x Exhaust Fan VFD Speed SK 14 x Exhaust Fan VFD Feedback 15 x Duct Pressurization DP Building Pressurization DΡ x Dirty Filter Switch DP Dirty Filter alarm D TYP VAV BOX x VAV Zone Damper 2 x VAV Velocity Pressure 3 x VAV Zone Temperature TI E TYP VAV BOX With REHEAT COIL VAV Zone Damper 2 x VAV HHW Valve VA 3 x VAV Velocity Pressure Р 4 x VAV Zone Temperature TI F TYP COMPUTER ROOM UNIT CRU-1 Thru CRU-7 x CRU Status 2 x CRU Space Temperature x Boiler Start/stop x Boiler Status

G HOT WATER HEATING SYSTEM | | x | HHW P-1 Start/Stop x HHW P-1 Status IC. x HHW P-2 Start/Stop x HHW P-2 Status IC 7 x Hot Water Supply Temperature TI 8 x | Hot Water Return Temperature TI 9 x Hot Water Temperature Reset

H OIL COOLING SYSTEM x Fluid Cooler FC-1 Start/Stop 2 x Fluid Cooler FC-1 Status IC C—1 Fail to start alarm 3 x Fluid Cooler FC-2 Start/Stop x Fluid Cooler FC-2 Status IC C-2 Fail to start alarm x CW P-3 Start/Stop 6 x CW P-3 Status 9—3 Fail to start alarm

x CW P-4 Start/Stop x CW P-4 Status IC 9—4 Fail tostart alarm x Cooling Water Supply Temperature TI x | Cooling Water Return Temperature 11 x Cooling Water Temperature Reset 12 x Oil Temperature TI High Temperature Alarm

A. Control System Overview

The control system shall be a DDC building automation and control system and include all components and labor required for a complete and functional system to perform the sequences listed herein. Provide all sensors, panels, wiring and conduits for a complete system. The system shall also include any additional points as required in the I/O point summaries. All programming and commissioning shall also be included. The system shall include a full graphic display of all system groups including point mapping.

Operator workstation including processor, monitor and printer will be provided by the

The DDC building automation and control system shall be as manufactured by KMC Controls.

B. Mechanical Overview

The mechanical system consists of three (3) VAV rooftop units (RTU 6,7,8) to serve the offices, classrooms and briefing rooms. These units will be provided with factory installed and wired controls. These units will have a supply and exhaust fan VFD, which will be factory mounted in the unit. These units will serve a total of approximately forty-seven (47) boxes (VAV & VAV with HW Re-heat coils.) There will be five (5) packaged constant volume rooftop units which serves the simulator bay areas with factory mounted and wired controls. There will be four (4) air handling units located in the simulator bays on the floor that serve the actual simulator units. These simulator air handling units will be small split system units with condensing units on the roof. They will have field mounted KMC controls and thermostats to be installed in the simulator units. There will be one exhaust fan (EF-1) serving toilet areas which will be started and stopped from KMD system on a time schedule. There will be three (3) pump room exhaust fans (EF-2, EF-3, and EF-4) and a smoke exhaust fan (EF-5) that will be monitored by the KMC system.

The computer room air conditioning units serving the computer rooms and the server room will be controlled by their factory controls and have an alarm point monitored by the KMC system. There will be one (1) boiler and two (2) circulating pumps serving the heating coils located in the variable air volume boxes. One of these pumps will be spare. These two pumps will lead/lag on a time schedule (adjustable) for the equal use of the equipment. There will be two fluid coolers located on the roof of the HPU units. These fluid coolers will be provided with their dedicated circulating cooling water pumps. One of the fluid coolers and one of the pumps will be stand by. These fluid coolers and the circulating pumps will lead/lag on a time schedule (adjustable) for the equal use of the equipment.

C. Packaged VAV Rooftop Units (3)

The roof top unit supply air fan VFD will be started by the KMD-5802 controller based on schedule or operator command. The KMD-5802 will monitor duct static pressure and control the VFD speed to maintain setpoint of 1.5 inches of water column. If the PID loop controlling the drive falls below 30% limit (adjustable) the drive will not go below 30% and command an alarm. The KMD-5802 will monitor alarm and feedback from the VFD to signal an alarm should one occur.

The KMD-5802 will monitor the discharge air temperature and cycle the stages of cooling to maintain a discharge air setpoint of 55 degrees. The KMD-5802 will prevent short cycling by including minimum off times of 5 minutes for all compressor stages. If the PID loop controlling the VFD falls below 50% sound an alarm indicating such. This is to allow the operator to consider raising the discharge air setpoint to prevent the airflow to drop enough to cause the coils to begin to freeze up.

When outside air temperature is less than the return air temperature, the economizer cycle shall be enabled. When outside air temperature is 2 degree F (adjustable) greater than the return air temperature, the economizer cycle will be disabled. As outside air temperature decreases below return air temperature setpoint, the outside air, return air and exhaust air dampers shall modulate to maintain desired supply air temperature.

The building pressure sensor shall compare building pressure with respect to ambient. The sensor shall control the exhaust air fan speed. As the building pressure rises above the operator defined setpoint (+0.05 inch adjustable), the exhaust fan speed shall ramp up to maintain desired setpoint. As the building pressure falls below setpoint, the exhaust fan speed shall ramp down to maintain desired setpoint.

A PID loop comparing actual duct static pressure (static pressure sensor located down the main supply duct near the last two variable air volume boxes) with its setpoint and ramp up or down the supply fan to maintain setpoint.

On the vav boxes without reheat coils, a PID loop will read the duct velocity, compare the actual space temperature to its setpoint and shall modulate vav box damper during the cooling mode to achieve the setpoint.

On the vav boxes with reheat coils, a PID loop will red the duct velocity, compare the actual space temperature to its setpoint and shall modulate vay box damper during the cooling mode to achieve the set point and modulate the heating control valve, if needed during the heating mode to achieve the setpoint.

Smoke detection in the supply air will sense the product of combustion and shut down the roof-top unit.

D. Computer Room Units

The computer room units CRU-1/ACC-1 through CRU-6/ACC-6 and the server room air-conditioning unit (CRU-7/ACC-7) will be on their own control; however, they shall be monitored by the EMS as per the I/O point summary. When the ceiling mounted air conditioning unit serving the server room fail to start; it will activate the controls for the vav box serving the server room (VAV-222) & initiate an alarm at the EMS.

Smoke detection in the supply air will sense the product of combustion and shut down the computer room units (CRU-1/ACC-1 through CRU-6/ACC-6) and send a signal to the fire alarm control panel (FACP).

E. Make-up air units (MAU-1 through MAU-3) room thermostat will start & stop the fan. Smoke detection in the space will detect the product of combustion and shut down the make—up air unit and send a signal to the FACP.

F. Exhaust fan toilet room exhaust fan (EF-1) will start & stop via time clock. Smoke removal exhaust fan (EF-2) will operate via a local on/off switch.

G. Packaged Constant Volume Rooftop Units (RTU-1 Through RTU-5)

The unit fan shall be started and stopped by the KMD-5802 based on the schedule or operator command. These units serve the simulator bay area. Each unit shall have a temperature sensor located on the lower part of the inside wall of the simulator bay.

Average the temperature sensors located at the wall and cycle the units as if they were one temperature sensor. To prevent the RTU's serving the simulator bays from fighting each other, cycle the cooling stages in each unit as though the system is served by one large RTU. Program a 30 second stage delay in the output for each compressor (30 seconds on the 1st RTU, 60 seconds on the 2nd RTU and 90 seconds on the 3rd RTU, etc.) to reduce demand draw. Continue to cycle compressors in series to maintain the average temperature throughout the simulator bay.

When outside air temperature is less than the return air temperature, the economizer cycle shall be enabled. When outside air temperature is 2 degree F (adjustable) greater than the relief air temperature, the economizer cycle will be disabled. As outside air temperature decreases below supply air temperature setpoint (55 degree F adjustable), the outside air, return air and exhaust air dampers shall modulate to maintain desired supply air temperature.

The building pressure sensor shall compare building pressure with respect to ambient. The sensor shall control the exhaust air fan on and off. As the building pressure rises above the operator defined setpoint (+0.05) inch adjustable, the exhaust fan shall start to maintain desired setpoint. As the building pressure falls below setpoint, the exhaust air fan shall shut down to maintain desired setpoint.

Smoke detection in the supply air will sense the product of combustion and shut down the rooftop unit.

A wall mounted smoke extraction timer located adjacent to the thermostat, when activated, will switch the respective RTU in economizer mode, deactivate the smoke detection system and remove simulator smoke from the space.

H. Split System AHU's for Simulator Units

These small units will be located on the floor level of the simulator bays and are to be future ducted into the simulator units themselves to control the temperature in the simulator. These units have a KMD-7302, which is factory programmed to do packaged unit control. The units will be cool only and have no heat. The units shall include a button on the zone sensor for a 2-hour adjustable override that the KMC system shall monitor. When the simulators are in place, the wall sensor will be installed into the simulators. AHU's with supply air quantity of more than 2000 cfm will be provided with smoke detection in supply air duct to shut down the unit upon the detection of product of combustion & send a signal to

I. Oil Cooling System

Two fluid coolers with their dedicated cooling water pumps located on the roof of the HPUs will circulate the fluid cooling water in the cooling water piping loop. One of these fluid cooler and one of these cooling water pumps will be spare These fluid coolers and the cooling water pumps will lead / lag on a time schedule for the equal use of the equipment. If the lead pump or the lead fluid cooler fails, the KMC system shall start the lag fluid cooler and its associated lag pump and generate an alarm.

Three way by-pass type temperature control valves TCV-1 through TCV-4 located along the wall inside HPU room will modulate water through the oil to water heat exchanger and maintain the oil temperature between 105 to 113 degree F. If the oil temperature is below 100 degree F, water flow through the heat exchanger will shut off. Water flow through the fluid cooler will remain constant.

J. Hot Water Heating System

The boiler shall be started by the KMC system any time the outdoor air temperature is below 60 degrees to allow for reheat where needed. The boiler pumps shall be started and stopped in a lead / lag fashion any time the boiler is commanded on. The lead pump shall prove flow before the boiler is started. If the lead pump fails, the KMD system shall start the lag pump and generate an alarm.

A pressure sustaining valve PSV-1 shall maintain a preset upstream water pressure (adjustable) and by-pass the flow of hot water. Heating hot water flow through the boiler will remain constant.

K. Miscellaneous Systems

4. 300 cfm

The exhaust fan EF-1 serving toilet areas will start on at time schedule from the EMS.

The exhaust fan EF-2, EF-3 and EF-4 serving pump rooms will be started and stopped via EMS and maintain the space temperature. DDC system will initiate an alarm if the exhaust fan fails to start.

The exhaust fan EF-5 serving the simulator smoke exhaust system will be started and stopped via a local on-off timer switch and remove the smoke. Smoke detection in RTU-5 will be deactivated when EF-5 is running. This exhaust fan will not be connected to the DDC

The KMC system will monitor addition points as listed in the I/O point summary.

All control systems shall confirm to cmc. Also see sheet M5.1.

DDC system will initiate an alarm if the exhaust fan fails to start.

L. Prior to reheating, recooling, or mixing air, the controls in VAV zones shall reduce the air supply to a minimum. The minimum shall be no greater than the largest of:

30% of the peak supply volume; or

2. Minimum ventilation requirements (Sec. 121) or 3. 0.4 cfm per square foot of conditioned floor area of the zone; or

M. Mechanical space conditioning systems supplying heated or cooled air to multiple zones (reheat VAV or constant volume systems) shall include controls that automatically reset the supply air temperature in response to representative building loads or to outdoor air temperature. The controls must be capable of resetting the supply air temperature at 25% of the difference between design supply air and design room temperatures.

# ABBREVIATIONS

DATE: 08-10-11