HNR

STRUCTURAL CALCULATION COVER SHEET

Date: 10-16-01

1 of 13

Calculation No:3442.053.SCAL.006,
Calculation Title: LDCC EC1 COOLING COIL FRAMING & SUPPORT
Project ID # 100256
Project Title: CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

ORIGINAL AND REVISED CALCULATION/ANALYSIS APPROVAL

	Rev. A Name/Signature/Date	Rev. 0 Name/Signature/Date	Rev._ Name/Signature/Date
Originator: DAVID APPLE	10/16/01	8-29-02	
Checked By: JIM WEEKS	10/16/01	8/29/02	
Approved By: JIM WEEKS	10/16/01	8/29/02	
Other:			

AFFECTED DOCUMENTS

Document Number	Document Title	Rev. Number
Drawing No. C52952	CCN Chilled Water System Optimization Master Plan	T1, M1-M33 Rev. B E1-E14 Rev. A
Drawing No. C52952	CCF/LDCC Cooling Plant Modifications	Rev.0
Drawing No. C53110	LDCC EC-1 Modifications	Rev.0

Record of Revision

Rev.	Reason for Revision
REV A	FIRST SUBMITTAL OF CALCULATIONS
Rev.0	All pages of this calculation 3442.053.SCAL.006 Rev. A are considered Rev. 0, approved and released based upon no technical changes to the calculation during/after review.

HNR Holmes & Narver | Raytheon **STRUCTURAL DESIGN CALCULATION SHEET**	Project Title: CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN Project ID #100256 Task Order # 053 2 of 13
Calculation No. 3442.053.SCAL.006	PERFORMED BY : _____ 10/16/01 DAVID APPLE
Rev. No. A	CHECKED BY: _____ 10/16/01 JIM WEEKS
Calculation Title: LDCC EC1 COOLING COIL FRAMING & SUPPORT	

INTRODUCTION

Purpose	Provide calculations to determine capacity of existing EC1 unit to support new cooling coil.
Scope	Verify that EC1 existing floor support members will support the new cooling coil specified for this project.

DESIGN BASIS

Design Inputs	Cooling coil data, including weight and size, provided by Mechanical Engineer and manufacturers printed information.
Criteria	LANL Facility Engineering Manual, Chapter 5 (Ref. 1) LANL Specification Section 13085, Seismic Protection (Ref. 2)
Assumptions	The EC1 floor member is assumed to be a channel section equivalent to a C8 x 11.5 channel, A 36 steel.

REFERENCES

(1) LANL Facility Engineering Manual, Chapter 5
(2) LANL Specification Section 13085, Seismic Protection
(3) ASCE 7-98
(4) AISC Manual of Steel Construction, 9th Edition
(5) IBC 2000
(6) DOE-STD-1020-94

METHODS

Hand calculations were used to prepare these calculations.

RESULTS AND CONCLUSIONS

Design calculations and details have been provided to support the specified cooling coil units specified for this project. The existing EC1 floor members are adequate to support the new cooling coils specified for this project.

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CALCULATION CHECKLIST

Task/Project #: 100256
Task Order 053
CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

Calculation Number: 3442.053.SCAL.006 3 of 13 | Revision A

Reviewer/Checker : JIM WEEKS

Reviewer performed or supervised subject calculation.
_____NO _X_YES Justification Attachment _____, _____ pages

Alternate Verification method approved _____ Method _____

Date 10/15/01

ITEM(S) CHECKED	Accept Y/N	OBJECTIVE EVIDENCE Sheets		INITIAL/ DATE
1. Cover forms properly completed.	Y			10/15
2. Calculation Sheet headers complete with calc. no., rev., etc.	Y			10/15
3. Calculation Sheet contents complete per format.	Y			10/15
4. Listed attachments included.	Y			10/15
5. Calculation Objective clearly described.	Y			10/15
6. Criteria are suitable and properly referenced to task-specific documents.	Y			10/15
7. Assumptions and data described and attached or referenced to task documents.	Y			10/15
8. Calculation method identified and appropriate for the design activity.	Y			10/15
9. Calculation results reasonable and correctly described in Results and Conclusions.	Y			10/15
10. Computer Program identified with version and revision.	N/A			
11. Computer Program references method used, etc.	N/A			
12. Computer input/output provided.	N/A			
13. Computer run traceable to calculation.	N/A			
14. Computer input data within permissible design input range.	N/A			
15. Computer Program validation/verification addressed.	N/A			

REMARKS

Checker Print Name & Sign Date 10/15/01
JIM WEEKS

Preparer Print Name & Sign Date 10-16-01
DAVID APPLE

CHECKED [illegible] DATE 1/13

APPROVED [illegible] DATE 1/13

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JOB NO. 034103442.0053
3442.053.SCAL.006 REV.A
SHEET 4 OF 13

TITLE LDCC EC1 COOLING COIL FRAMING & SUPPORT
CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN
#100256

BY DAA DATE 9-29-01

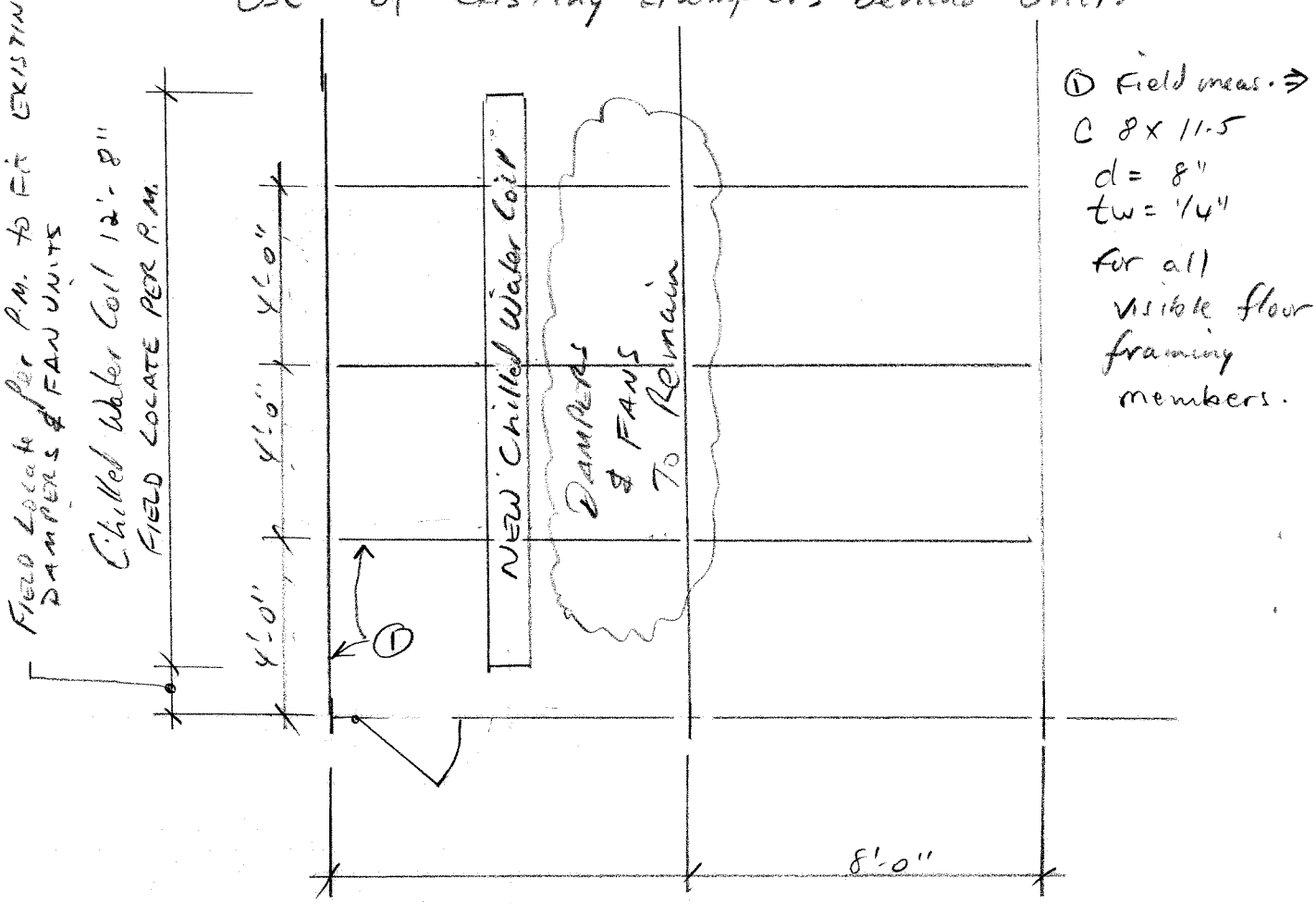
Investigate EC1 floor capacity to support new chilled water coil.

New Coil Data:

MCC100 Trane Modular #100 Coil Section MCCA100
Height = 119 1/2" (±)
Width = 152" (12'-8")
Weight = 3457 lbs (wet weight per David Walker, B&P, phone call to verify 9-20-01)

Assume: Drain pan provided with unit will be full width and depth.

Locate ± at location of existing unit to retain use of existing dampers behind unit.



FORM 8X8

CHECKED [illegible] DATE 1/13

APPROVED [illegible] DATE 1/13

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JOB NO. 034103442.0053
3442.053.SCAL.006 REV. A

SHEET 5 OF 13

TITLE LDCC ECI COOLING COIL FRAMING & SUPPORT BY DAA DATE 9-29-01
CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

#100258

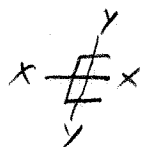
Calculate load from new coil:

$(3\,450\ \text{lbs}) / (19'' \times 152'') = 1.2\ \text{psi} \cong 175\ \text{psf}.$

$w_{coil} = 175\ \text{psf}.$

- New coil ± same size as existing evap. media unit being replaced
- New coil will span at least 3 floor framing members - C 8 x 11.5 (assumed). A36 assumed.

C 8 x 11.5



$A = 3.38\ \text{in}^2$
$d = 8.00\ \text{in}$
$t_w = 0.22\ \text{in}$
$wt = 11.5\ \text{plf}$

$I_x = 32.6\ \text{in}^4$
$S_x = 8.14\ \text{in}^3$

For 8' simple span (conservative): [Looks like slab on grade below EC-1.]

$F_b = 0.66\,F_y = 0.66(36) = 23.76\ \text{ksi}$

$f = \frac{M}{S} \Rightarrow M_{max} = 23.76\ \text{ksi}\,(8.14\ \text{in}^3) = 193.4\ \text{k-in}$
$= 16.1\ \text{k-ft}.$

Moment for 4ft tributary (175psf) = 700 lbs
@ ℄ span = $PL/4 = 700\,\text{lbs}\,(8\,\text{ft})/4 = 1.4$ k-ft

Moment if $w_{LL} = 120$ plf (≈ 30 psf x 4' trib.)
@ ℄ span = $wl^2/8 = (0.12)(8)^2/8 = 0.96$ k-ft

$M_{TOTAL} = 2.4\ \text{kft} \ll 16\ \text{kft} \Rightarrow$ Floor members ok.
Assume floor plate will support coil ⇒ ok.

∴ ECI floor will support new coil. OK ✓

FORM 8X8

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JOB NO. 034103442.0053
3442.053-SCAL. 006 Rev. A.

SHEET 6 OF 13

TITLE LDCC ECI COOLING COIL FRAMING & SUPPORT BY DAA DATE 9-29-01
CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN
#100256

Other issues discussed during site visit:

1. Field crew can mount new unit to framing structure of existing unit with modifications as required. Verify with Project Manager at time of installation. Provide "as-built" of installation upon completion of project for engineer review if no shop drawings are provided prior to construction.

2. Field crew can modify fan dampers as required, to prevent back-flow of air, per mechanical engineer and/or Project Manager. This was not seen as a significant structural issue.

3. Solid metal plate may be installed by field crew per P.M. to modify/prevent back flow of air. This was not seen as a significant structural issue.

∴ At site visit (David Walker, Bridges & Paxton, David Apple and Jim Weeks, DMJM H+N, Doug Hefele, LANL Facility M.E.)
these items above will not require engineering designs. (D. Walker, D. Apple, J. Weeks agreed).

A memo to David Walker will document this information.

FORM 8X8

Holmes & Narver
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CHECKED DATE 10/15/01 JOB NO. 3442.053.SCAL.006
Rev. A

APPROVED DATE 10/15/01 SHEET 1 OF 7

BY DAA DATE 10-15-01

TITLE LDCC EC1 Cooling Coil Framing & Support
#100256 CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN

APPENDIX

Trane Product Literature and Specs, Model MCCA100	4 pages
Drawing No. C52952, Sheet M8	1 page
AISC ASD 9th Edition, p. 1-40, Channels, American Standard	1 page

Tag Data - Indoor Central Station Air Handler Units

Item	Tag(s)	Qty	Description	Model Number
A1	MCC-100	1	Trane Modular #100 Coil Section	MCCA100

Product Data
Item; A1 Qty: 1 Tag(s): MCC-100

Modular base unit
- Coil Module MCCA-100
- Modular climate changer
- 19 Unit length
- External support kit - ship attached
- Listed UL unit

Coil (Pos #1)
- Medium horizontal coil module
- Full coil height
- Insulation Double Wall Solid 1 1/2 lb (25mm 0.510kg)
- Galvanized IAQ Drain Pan - Right Hand Connection
- Type "K" coil
- Cooling coil
- Coil supply right hand
- 4 row coil
- 87 Coil fins per foot (fins per meter)
- Prima flo E (energy efficient)
- Aluminum fins
- .020" (0.508mm) Standard Copper Tubes
- Galvanized steel coil casing

or 500 ft/min
to mph = 5.7 mph.

Performance Data

Tags	MCC-100
Coil	
Position	#1
Airflow (cfm)	52842.0
Total Capacity (MBH)	806
Dry coil weight (lb)	1661.3
Entering dry bulb (F)	73.40
Entering wet bulb (F)	53.10
Water temperature rise (F)	6.50
Sensible capacity (MBH)	806
Leaving dry bulb (F)	55.00
Leaving wet bulb (F)	46.16
Entering water temperature (F)	45.00
Leaving water temperature (F)	51.50
Standard fluid flow rate (gpm)	248.06
Water volume (gal)	53.47
Water pressure drop (ft H2O)	10.35
Air pressure drop (in H2O)	0.18
Elevation (ft)	7500.00
Face velocity (ft/min)	545.11
Face area (sq ft)	96.94
Wet coil weight (lb)	2107.2
Fouling factor (hr-sq ft-deg F/Btu)	0.00000
Water velocity (ft/sec)	4.15
Module length (in)	19.000

$\frac{CFM}{\text{Area coil seeing wind}}$ = vel. 425 ft per min. 5.4 ⇒ mph
$\frac{}{147" \times 29"}$ Force ⇒ 8 psf.

verify

$1\ ft^3 = 7.48\ gal$
$\Rightarrow 53.47\ gal \times \frac{1\ ft^3}{7.48\ gal} = 7.18\ ft^3$
water @ $62.4\ \frac{lbs}{ft^3} \times 7.17\ ft^3 = 448\ lbs.$
wt wtr = 448 lbs

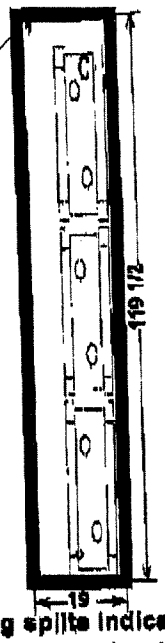
SEE p 5/12 for weight information

As-Built - Indoor Central Station Air Handler Units
Item: A1 Qty: 1 Tag(s): MCC-100

5" ± See p. 7 1/2

Lines up with front face of all system.

mount of galv. ∡, L's



Overall Elevation View: Right - Shipping splits indicated by bold outline. - Measurements in Inches

Pos #	Module	Length	Weight
1	Coil	19	3457.05

Installed Unit Weight 3457.05 lbs ← wet wt.

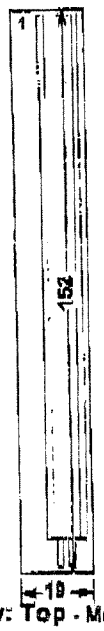
3457 lbs

Per David Walker
Phone conv. 9-20-01

152" wide

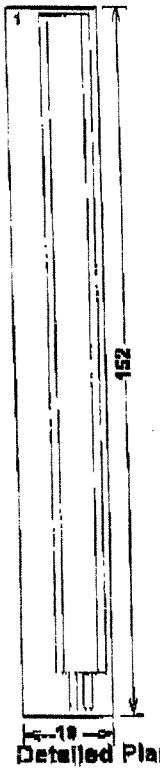
$\frac{3457 \text{ lbs}}{152\text{" wide}} = 22.7 \frac{\text{lbs}}{\text{inch}}$

= 273 plf.

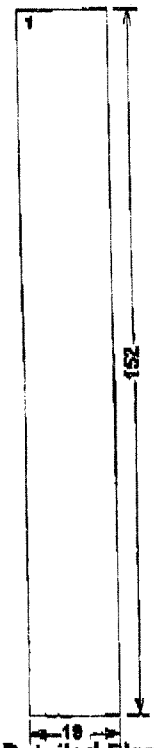


Overall Plan View: Top - Measurements in Inches

As-Built - Indoor Central Station Air Handler Units
Item: A1 Qty: 1 Tag(s): MCC-100

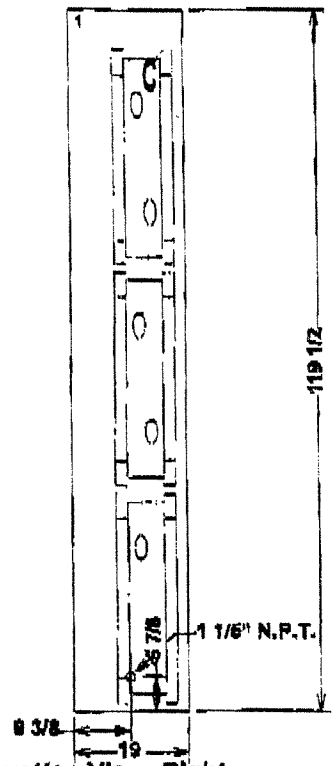


Right Side of Unit **Detailed Plan View: Top** - Measurements in Inches

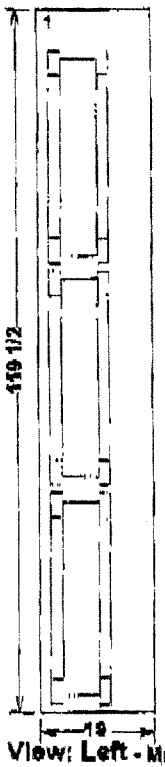


Left Side of Unit **Detailed Plan View: Bottom** - Measurements in Inches

As-Built - Indoor Central Station Air Handler Units
Item: A1 Qty: 1 Tag(s): MCC-100

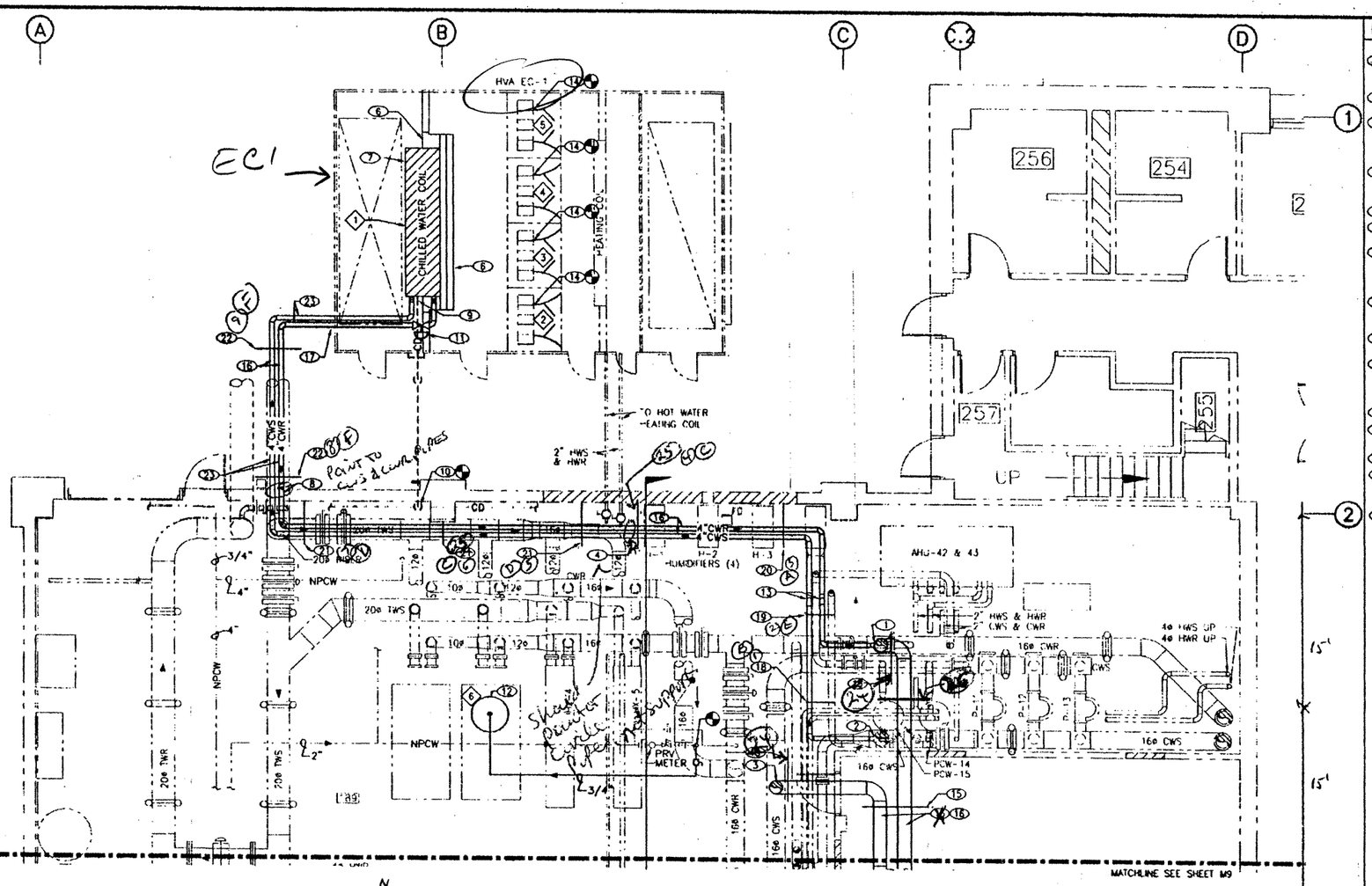


Detailed Elevation View: Right - Measurements in inches



Detailed Elevation View: Left - Measurements in inches

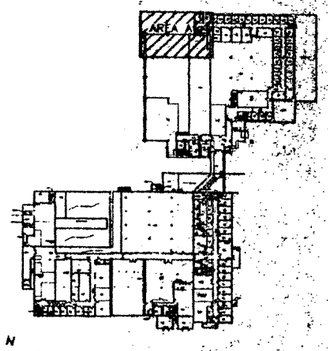
12



CHILLED WATER PIPING AND HVAC PLAN – AREA A
SCALE: 1/4"=1'-0"

KEYED NOTES

1. SEE DETAIL 3/M17 FOR CWR CONNECTION DETAIL.
2. SEE DETAIL 4/M17 FOR CWS CONNECTION DETAIL.
3. HOT TAP THE CWS WITH A 12"ø. INSTALL A 12"ø VALVE AND EXTEND CWS PIPING AS SHOWN. SEE DETAIL 5/M17 MEZZANINE FRAMING
4. ROUTE CWS AND CWR PIPING UP ON TOP OF STRUCTURE. SEE DETAIL 2/M16.
5. NOT USED
6. INSTALL 14GA. SHEET METAL BLANK DOWN STREAM OF INACTIVE PORTION OF COIL FACE DAMPERS.
7. INSTALL CHILLED WATER COILAND COIL CASING. SEE DETAIL 1/M17 AND 2/M17 FOR PROCEDURE.
8. CORE DRILL AND SLEEVE 4"ø CHILLED WATER SUPPLY AND RETURN PIPING THROUGH WALL. SEAL OPENING WITH LINK SEAL OR EQUIVALENT. INSTALL ESCUTIONS ON BOTH SIDES OF WALL FOR EACH PIPE.
9. ROUTE 1-1/2" CONDENSATE DRAIN FROM COIL BRANCH AND SUMP PUMP UP TO BOTTOM OF PIPE 10'-0".
10. ROUTE CONDENSATE DRAIN UP 85" ABOVE GRADE. SLOPE DRAIN PIPE TOWARD BUILDING. SLEEVE PIPE THROUGH WALL. SEAL WALL PENETRATION WITH LINK SEAL. DROP CONDENSATE DRAIN PIPING DOWN AND CONNECT TO EXISTING 1-1/2"ø DRAIN PIPE.
11. INSTALL MODULATING TWO WAY CONTROL VALVE. SEE CONTROL DRAWINGS.
12. INSTALL CHILLED WATER EXPANSION TANK ON EXISTING CONCRETE PAD AND ANCHOR IN PLACE. SET PRESSURE AT 25 PSIG.
13. DROP PIPE DOWN TO WITHIN 12" OF TOP OF MEZZANINE LATTICE.
14. INSTALL NEW INLET CONE WITH INLET VANE DAMPERS. INSTALL IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. FURNISH AND INSTALL PNEUMATIC ADAPTER WITH EACH DAMPER.
15. SEE STRUCTURAL DETAIL 4/M15 FOR PIPE SUPPORT AND SEISMIC RESTRAINT REQUIREMENTS.



KEYPLAN
SCALE: NONE

NOT FOR CONSTRUCTION

KEYED NOTES (CONT.)

16. INSULATE PIPING. SEE SPECIFICATIONS.
17. SUPPORT PIPING AT WALL OF UNIT EC-1 USING P-1000 UNISTRUT AND CLAMPS. SEAL PIPE PENETRATIONS WITH EXTERIOR TYPE CAULKING.
18. SUPPORT PIPING ~~AT WALL~~. SEE STRUCTURAL DETAIL 1/M16 (B) FROM EXISTING STRUCTURE
19. SUPPORT PIPING ~~AT WALL~~. SEE STRUCTURAL DETAIL 4/M16 (E) FROM EXISTING STRUCTURE
20. SUPPORT PIPING ~~AT WALL~~. SEE STRUCTURAL DETAIL 4/M15 (A) OK AS IT WAS — 2/M15 (A)
21. SUPPORT PIPING ~~AT WALL~~. SEE STRUCTURAL DETAIL 3/M16 (D)
22. SUPPORT PIPING ~~AT WALL~~. SEE STRUCTURAL DETAIL 5/M16 (5) FROM EXISTING PIPE BRIDGE STRUCTURE
23. INSTALL HEAT CABLE ON EXTERIOR CWR AND CWS CHILLED WATER PIPING. COORDINATE WITH DIVISION 16.
24. SEE STRUCTURAL DETAIL 5/M15 FOR PIPE SUPPORT AND SEISMIC RESTRAINT REQUIREMENTS
25. SUPPORT PIPING FROM EXISTING STRUCTURE. SEE STRUCTURAL DETAIL 2/M16 (C)
26. SEE NOTE 15 except provide every 4 pipe diam. Stand for 12" DIA PIPE.

0' 1' 2' 4' 6' 8'
1/4"=1'-0"

ENGINEER'S SEAL

REV	DATE	CLASS REV	REVISIONS	DRN	RS	CHKD	QA	AP
B	10/5/01		90% "IN-HOUSE REVIEW"	RC	MS	DD		
A	9/18/01		60% "IN-HOUSE REVIEW"	RC	MS	DD		

HOLMES & NARVER/RAYTHEON (HNR)
HOLMES & NARVER/RAYTHEON ENGINEERS & CONSTRUCTORS
CHAPPS-GRIFFITH CONSULTING ENGINEERS
SHIGLERE & PAXTON CONSULTING ENGINEERS

CCN CHILLED WATER SYSTEM OPTIMIZATION MASTER PLAN
MECH: CHILLED WATER PIPING AND HVAC PLAN – AREA A

BLDG. 1498 & 132 TA-3

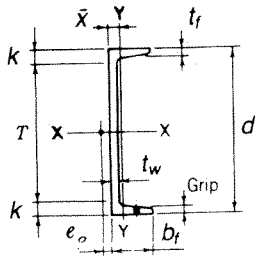
SUBMITTED: DINGHT DORSEY
APPROVED FOR RELEASE: DOUG MERCER

Los Alamos
LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO, USA

SHEET M8

PROJECT ID: 100256
DRAWING NO.: C52852
REV: B

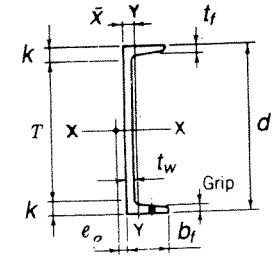
Cad File Name: 100256M8.dwg
Date Plotted: 10/11/01
Time Plotted: 11:08:37
Login Initials: rpc



CHANNELS
AMERICAN STANDARD
Dimensions

Designation	Area A	Depth d	Web Thickness t_w		Web $\frac{t_w}{2}$	Flange Width b_f		Flange Average thickness t_f		Distance T	Distance k	Grip	Max. Flge. Fastener
	In.^{2}	In.	In.		In.	In.		In.		In.	In.	In.	In.
C 15×50	14.7	15.00	0.716	11/16	3/8	3.716	3¾	0.650	5/8	12⅛	1 7/16	5/8	1
×40	11.8	15.00	0.520	½	¼	3.520	3½	0.650	5/8	12⅛	1 7/16	5/8	1
×33.9	9.96	15.00	0.400	3/8	3/16	3.400	3⅜	0.650	5/8	12⅛	1 7/16	5/8	1
C 12×30	8.82	12.00	0.510	½	¼	3.170	3⅛	0.501	½	9¾	1⅛	½	7/8
×25	7.35	12.00	0.387	3/8	3/16	3.047	3	0.501	½	9¾	1⅛	½	7/8
×20.7	6.09	12.00	0.282	5/16	⅛	2.942	3	0.501	½	9¾	1⅛	½	7/8
C 10×30	8.82	10.00	0.673	11/16	5/16	3.033	3	0.436	7/16	8	1	7/16	¾
×25	7.35	10.00	0.526	½	¼	2.886	2⅞	0.436	7/16	8	1	7/16	¾
×20	5.88	10.00	0.379	3/8	3/16	2.739	2¾	0.436	7/16	8	1	7/16	¾
×15.3	4.49	10.00	0.240	¼	⅛	2.600	2⅝	0.436	7/16	8	1	7/16	¾
C 9×20	5.88	9.00	0.448	7/16	¼	2.648	2⅝	0.413	7/16	7⅛	15/16	7/16	¾
×15	4.41	9.00	0.285	5/16	⅛	2.485	2½	0.413	7/16	7⅛	15/16	7/16	¾
×13.4	3.94	9.00	0.233	¼	⅛	2.433	2⅜	0.413	7/16	7⅛	15/16	7/16	¾
C 8×18.75	5.51	8.00	0.487	½	¼	2.527	2½	0.390	3/8	6⅛	15/16	3/8	¾
×13.75	4.04	8.00	0.303	5/16	⅛	2.343	2⅜	0.390	3/8	6⅛	15/16	3/8	¾
×11.5	3.38	8.00	0.220	¼	⅛	2.260	2¼	0.390	3/8	6⅛	15/16	3/8	¾
C 7×14.75	4.33	7.00	0.419	7/16	3/16	2.299	2¼	0.366	3/8	5¼	7/8	3/8	5/8
×12.25	3.60	7.00	0.314	5/16	3/16	2.194	2¼	0.366	3/8	5¼	7/8	3/8	5/8
× 9.8	2.87	7.00	0.210	3/16	⅛	2.090	2⅛	0.366	3/8	5¼	7/8	3/8	5/8
C 6×13	3.83	6.00	0.437	7/16	3/16	2.157	2⅛	0.343	5/16	4⅜	13/16	5/16	5/8
×10.5	3.09	6.00	0.314	5/16	3/16	2.034	2	0.343	5/16	4⅜	13/16	3/8	5/8
× 8.2	2.40	6.00	0.200	3/16	⅛	1.920	1⅞	0.343	5/16	4⅜	13/16	5/16	5/8
C 5× 9	2.64	5.00	0.325	5/16	3/16	1.885	1⅞	0.320	5/16	3½	¾	5/16	5/8
× 6.7	1.97	5.00	0.190	3/16	⅛	1.750	1¾	0.320	5/16	3½	¾	—	—
C 4× 7.25	2.13	4.00	0.321	5/16	3/16	1.721	1¾	0.296	5/16	2⅝	11/16	5/16	5/8
× 5.4	1.59	4.00	0.184	3/16	1/16	1.584	1⅝	0.296	5/16	2⅝	11/16	—	—
C 3× 6	1.76	3.00	0.356	3/8	3/16	1.596	1⅝	0.273	¼	1⅝	11/16	—	—
× 5	1.47	3.00	0.258	¼	⅛	1.498	1½	0.273	¼	1⅝	11/16	—	—
× 4.1	1.21	3.00	0.170	3/16	1/16	1.410	1⅜	0.273	¼	1⅝	11/16	—	—

CHANNELS
AMERICAN STANDARD
Properties



Nominal Wt. per Ft	$\bar{x}$	Shear Center Location e_o	$\frac{d}{A_f}$	Axis X-X I	Axis X-X S	Axis X-X r	Axis Y-Y I	Axis Y-Y S	Axis Y-Y r
Lb.	In.	In.		In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.
50	0.798	0.583	6.21	404	53.8	5.24	11.0	3.78	0.867
40	0.777	0.767	6.56	349	46.5	5.44	9.23	3.37	0.886
33.9	0.787	0.896	6.79	315	42.0	5.62	8.13	3.11	0.904
30	0.674	0.618	7.55	162	27.0	4.29	5.14	2.06	0.763
25	0.674	0.746	7.85	144	24.1	4.43	4.47	1.88	0.780
20.7	0.698	0.870	8.13	129	21.5	4.61	3.88	1.73	0.799
30	0.649	0.369	7.55	103	20.7	3.42	3.94	1.65	0.669
25	0.617	0.494	7.94	91.2	18.2	3.52	3.36	1.48	0.676
20	0.606	0.637	8.36	78.9	15.8	3.66	2.81	1.32	0.692
15.3	0.634	0.796	8.81	67.4	13.5	3.87	2.28	1.16	0.713
20	0.583	0.515	8.22	60.9	13.5	3.22	2.42	1.17	0.642
15	0.586	0.682	8.76	51.0	11.3	3.40	1.93	1.01	0.661
13.4	0.601	0.743	8.95	47.9	10.6	3.48	1.76	0.962	0.669
18.75	0.565	0.431	8.12	44.0	11.0	2.82	1.98	1.01	0.599
13.75	0.553	0.604	8.75	36.1	9.03	2.99	1.53	0.854	0.615
11.5	0.571	0.697	9.08	32.6	8.14	3.11	1.32	0.781	0.625
14.75	0.532	0.441	8.31	27.2	7.78	2.51	1.38	0.779	0.564
12.25	0.525	0.538	8.71	24.2	6.93	2.60	1.17	0.703	0.571
9.8	0.540	0.647	9.14	21.3	6.08	2.72	0.968	0.625	0.581
13	0.514	0.380	8.10	17.4	5.80	2.13	1.05	0.642	0.525
10.5	0.499	0.486	8.59	15.2	5.06	2.22	0.866	0.564	0.529
8.2	0.511	0.599	9.10	13.1	4.38	2.34	0.693	0.492	0.537
9	0.478	0.427	8.29	8.90	3.56	1.83	0.632	0.450	0.489
6.7	0.484	0.552	8.93	7.49	3.00	1.95	0.479	0.378	0.493
7.25	0.459	0.386	7.84	4.59	2.29	1.47	0.433	0.343	0.450
5.4	0.457	0.502	8.52	3.85	1.93	1.56	0.319	0.283	0.449
6	0.455	0.322	6.87	2.07	1.38	1.08	0.305	0.268	0.416
5	0.438	0.392	7.32	1.85	1.24	1.12	0.247	0.233	0.410
4.1	0.436	0.461	7.78	1.66	1.10	1.17	0.197	0.202	0.404