

Geotechnical Evaluation Report

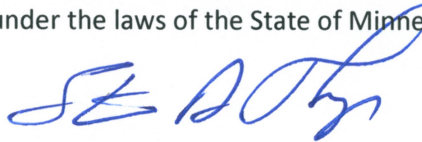
Repair Foundations Buildings 4, 7, 59
St. Cloud VA Medical Center
St. Cloud, Minnesota

Prepared for

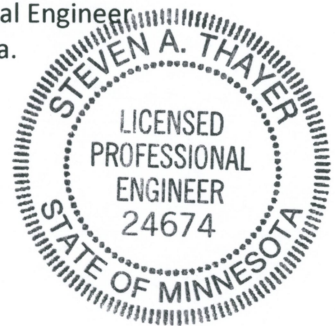
LHB, Inc.

Professional Certification:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Steve A. Thayer, PE
Associate Principal/Senior Engineer
License Number: 24674
June 10, 2014



Project B14-02230

Braun Intertec Corporation

June 9, 2014

Project B14-02230

Mr. Evan Aljoe
LHB, Inc.
701 Washington Avenue North, Suite 200
Minneapolis, MN 55401

Re: Geotechnical Evaluation
Repair Foundations Buildings 4, 7, 59
St. Cloud VA Medical Center
St. Cloud, Minnesota

Dear Mr. Aljoe:

We are pleased to present this Geotechnical Evaluation Report for the foundation repair project at the St. Cloud VA Medical Center. A summary of our results and recommendations is presented below. More detailed information and recommendations follow the Table of Contents.

Summary of Results

We completed 6 borings for the project, Borings ST-1 through ST-3 adjacent Building 59, Boring ST-4 adjacent Building 7, and Borings ST-5 and ST-6 adjacent the tunnel between Building 4 and Building 7. The borings generally encountered 2 to 10 feet of fill underlain by poorly graded sand and poorly graded gravel. Penetration resistances indicated the natural sands and gravel ranged from loose to dense. Groundwater was observed at depths ranging from 17 to 18 feet, except in Boring ST-4, where it was observed at a depth of 6 feet.

Summary of Recommendations

Based on the borings, it is our opinion the natural sand and gravel soils encountered in the borings are suitable for supporting the buildings on spread footing foundations or helical piers. Based on the borings, it is our opinion the soils are suitable for footings designed for a net allowable bearing capacity up to 4,000 pounds per square foot.

Remarks

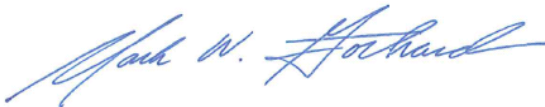
Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Steve Thayer at 320.980.3187 or sthayer@braunintertec.com.

Sincerely,

BRAUN INTERTEC CORPORATION



Steve A. Thayer, PE
Associate Principal/Senior Engineer



Mark W. Gothard, PE
Principal Engineer

Table of Contents

Description	Page
A. Introduction.....	1
A.1. Project Description.....	1
A.2. Purpose.....	1
A.3. Background Information and Reference Documents.....	1
A.4. Scope of Services.....	1
B. Results.....	2
B.1. Exploration Logs.....	2
B.1.a. Log of Boring Sheets.....	2
B.1.b. Geologic Origins.....	2
B.2. Geologic Profile.....	3
B.2.a. Geologic Materials.....	3
B.2.b. Groundwater.....	3
C. Basis for Recommendations.....	4
C.1. Design Details.....	4
C.2. Design Considerations.....	4
D. Recommendations.....	5
D.1. Spread Footings.....	5
D.1.a. Net Allowable Bearing Pressure.....	5
D.1.b. Settlement.....	5
D.2. Configuring and Resisting Lateral Loads.....	5
D.3. Helical Piers.....	5
E. Procedures.....	6
E.1. Penetration Test Borings.....	6
E.2. Material Classification and Testing.....	6
E.2.a. Visual and Manual Classification.....	6
E.3. Groundwater Measurements.....	6
F. Qualifications.....	7
F.1. Variations in Subsurface Conditions.....	7
F.1.a. Material Strata.....	7
F.1.b. Groundwater Levels.....	7
F.2. Continuity of Professional Responsibility.....	7
F.2.a. Plan Review.....	7
F.2.b. Construction Observations and Testing.....	8
F.3. Use of Report.....	8
F.4. Standard of Care.....	8

Appendix

Boring Location Sketches (3 pages)

Descriptive Terminology

Log of Boring Sheets ST-1 through ST-7

A. Introduction

A.1. Project Description

This Geotechnical Evaluation Report addresses the foundation repair project for Buildings 4, 7 and 59. The project is located on the St. Cloud VA Medical Center in St. Cloud, Minnesota.

A.2. Purpose

The purpose of our geotechnical evaluation was to characterize subsurface geologic conditions at selected exploration locations and evaluate their ability to support the existing foundations.

A.3. Background Information and Reference Documents

To facilitate our evaluation, we were provided with or reviewed the following information or documents:

- Aerial photograph of the site.
- Plan Sheets C-3 and C-6 for the Tunnel/Loading Dock Repair prepared by Lightowler Johnson Associates, dated December 13, 1999.
- Building 59 First Floor Plan, undated.
- Plan Sheet S1, for the Laundry Washroom Expansion prepared by Pauly & Olsen Associates, dated January 23, 1985.
- Building 7 First Floor Plan dated July 17, 1989.
- Partial copies of plan sheets for Building 7, showing typical wall and building sections.

A.4. Scope of Services

Our scope of services for this project was originally submitted as a Proposal to Mr. Evan Aljoe of LHB, Inc. We received a work order indicating authorization to proceed from Mr. Aljoe on April 28, 2014. Tasks performed in accordance with our authorized scope of services included:

- Performing a reconnaissance of the site to evaluate equipment access to exploration locations.
- Staking the boring locations and coordinating the locating of underground utilities.
- Performing 6 penetration test borings to a depth of 30 feet each.
- Preparing this report containing a sketch, exploration logs, a summary of the geologic materials encountered, results of laboratory tests, and recommended design bearing pressures, lateral earth pressures and suitability of the soils for helical pile installation.

We staked exploration locations by measuring dimensions from nearby buildings or other site features with a tape or surveyor's wheel at approximate right angles from those references.

B. Results

B.1. Exploration Logs

B.1.a. Log of Boring Sheets

Log of Boring sheets for our penetration test borings are included in the Appendix. The logs identify and describe the geologic materials that were penetrated, and present the results of penetration resistance tests performed within them and groundwater measurements.

Strata boundaries were inferred from changes in the penetration test samples and the auger cuttings. Because sampling was not performed continuously, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may also occur as gradual rather than abrupt transitions.

B.1.b. Geologic Origins

Geologic origins assigned to the materials shown on the logs and referenced within this report were based on a review of the background information and reference documents cited above, visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, penetration resistance testing performed for the project, and available common knowledge

of the geologic processes and environments that have impacted the site and surrounding area in the past.

B.2. Geologic Profile

B.2.a. Geologic Materials

Building 59. Borings ST-1 through ST-3 were completed on the north and east sides of Building 59. The borings generally encountered 4 to 8 feet of existing fill underlain by poorly graded sand to depths ranging from 17 to 24 feet. Gravel was encountered below the sand at these depths. Poorly graded sand was encountered below the gravel in Boring ST-2 at a depth of 20 feet.

Penetration resistances in the sand and gravel generally ranged from 6 to 45 blows per foot (BPF), indicating they ranged from loose to dense.

Building 7. Boring ST-4 was conducted on the east side of Building 7. The boring encountered about 2 feet of fill underlain by poorly graded sand to a depth of 12 feet. Gravel was encountered below 12 feet and extended to a depth of 19 feet. Poorly graded sand was encountered below 19 feet.

Penetration resistances in the sand and gravel ranged from 7 to 50 BPF, indicating they ranged from loose to dense. In general, the penetration resistances increased with depth.

Tunnel. Borings ST-5 and ST-6 were conducted adjacent the utility tunnel between Building 4 and Building 7. The borings encountered 3 and 10 feet of fill underlain by poorly graded sand to depths of 19 and 22 feet. Gravel was encountered below the sand at these depths.

Penetration resistances in the sand and gravel ranged from 5 to 50 BPF, indicating they ranged from loose to dense.

B.2.b. Groundwater

Groundwater was observed at depths ranging from 17 to 18 1/2 feet, except in Boring ST-4, where it was observed at a depth of 6 feet. The ground surface elevation at Boring ST-4 was about 10 feet lower than the other borings. Seasonal and annual fluctuations of groundwater, however, should be anticipated.

C. Basis for Recommendations

C.1. Design Details

Mr. Cory Mark, Technical Services and Consulting, LLC, indicated the project consists of repairs to the existing foundations for Buildings 7 and 59, and the utility tunnel between Buildings 4 and 7. The scope of the repair was not provided, except that helical piers are being considered for underpinning Building 59. Based on the plans provided, it appears the Building 59 footings bear approximately 10 feet below existing grades, Building 7 footings bear approximately 4 feet below existing grade, and the tunnel footings bear 7 to 10 feet below existing grades. We have assumed column loads are less than 200 kips and wall loads are less than 10 kips.

In general, Mr. Mark requested we provide soil bearing pressures, expected foundation settlements, lateral soil loads on basement walls and soil profiles.

We have attempted to describe our understanding of the proposed construction to the extent it was reported to us by others. Depending on the extent of available information, assumptions may have been made based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, we should be notified. New or changed information could require additional evaluation, analyses and/or recommendations.

C.2. Design Considerations

Based on the borings, it appears the foundations likely bear on the natural sands. These soils appear suitable for support of the spread footing foundations.

The natural sand and gravel soils also appear suitable for installation of helical piers.

D. Recommendations

D.1. Spread Footings

D.1.a. Net Allowable Bearing Pressure

Based on the borings, it is our opinion the soils are suitable for footings sized to exert a net allowable bearing pressure up to 4,000 pounds per square foot (psf), including all transient loads. This value includes a safety factor of at least 3.0 with regard to bearing capacity failure.

D.1.b. Settlement

We estimate that total and differential settlements among the footings will amount to less than 1 inch and 1/2 inch, respectively, under the assumed loads.

D.2. Configuring and Resisting Lateral Loads

Below-grade wall design can be based on active earth pressure conditions if the walls are allowed to rotate slightly. If rotation cannot be tolerated, then design should be based on at-rest earth pressure conditions. Rotation up to 0.002 times the wall height is generally required to mobilize active earth pressures when walls are backfilled with sand. For the active case, we recommend designing for an equivalent fluid pressure of 32 pounds per square foot per foot of depth (pcf). For the at-rest case, we recommend designing for an equivalent fluid pressure of 55 pcf.

Our recommended design values are based on a wet unit backfill weight for sand of 115 pcf, an internal friction angle of 32 degrees, and assume a level backfill with no surcharge. Our design values will need to be revised for sloping backfill or other dead or live loads that are placed within a horizontal distance behind the walls that is equal to the height of the walls. Our design values also assume that the walls are drained so that water cannot accumulate behind the walls.

Resistance to lateral earth pressures will be provided by passive resistance against the retaining wall footings, and by sliding resistance along the bottoms of the wall footings. We recommend assuming a passive pressure equal to 600 pcf and a sliding coefficient equal to 0.45. These values are un-factored.

D.3. Helical Piers

As indicated in Section B, the site is underlain with sand. Sand is typically suitable for support of helical piers.

Helical piers consist of hollow tubes or solid square steel shafts, typically 1 1/2 to 3 1/2 inches in diameter, to which a series of steel plates are attached. Because the shafts are structurally slender, helical piers derive most of their capacity through plate bearing. Once the number, size and spacing of the plates has been determined based on loading requirements, the piers are screwed into the ground until a specified torque and minimum depth are met.

A number of options are available in type of the helical piers to be used. We recommend you consult a specialty contractor for typical size and design of the piers.

E. Procedures

E.1. Penetration Test Borings

Borings ST-1 through ST-3, ST-5 and ST-6 were drilled with a truck-mounted core and auger drill equipped with hollow-stem auger. The borings were performed in accordance with ASTM D 1586. Penetration test samples were taken at 2 1/2- or 5-foot intervals, with continuous sampling conducted near bottom of footing depths. Actual sample intervals and corresponding depths are shown on the boring logs. Boring ST-4 was conducted with our Geoprobe rig advancing casing and conducting penetration test samples.

E.2. Material Classification and Testing

E.2.a. Visual and Manual Classification

The geologic materials encountered were visually and manually classified in accordance with ASTM Standard Practice D 2488. A chart explaining the classification system is attached. Samples were placed in jars or bags and returned to our facility for review and storage.

E.3. Groundwater Measurements

The drillers checked for groundwater as the penetration test borings were advanced, and again after auger withdrawal. The boreholes were then backfilled as noted on the boring logs.

F. Qualifications

F.1. Variations in Subsurface Conditions

F.1.a. Material Strata

Our evaluation, analyses and recommendations were developed from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth, and therefore strata boundaries and thicknesses must be inferred to some extent. Strata boundaries may also be gradual transitions, and can be expected to vary in depth, elevation and thickness away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until additional exploration work is completed, or construction commences. If any such variations are revealed, our recommendations should be re-evaluated. Such variations could increase construction costs, and a contingency should be provided to accommodate them.

F.1.b. Groundwater Levels

Groundwater measurements were made under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. It should be noted that the observation periods were relatively short, and groundwater can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

F.2. Continuity of Professional Responsibility

F.2.a. Plan Review

This report is based on a limited amount of information, and a number of assumptions were necessary to help us develop our recommendations. It is recommended that our firm review the geotechnical aspects of the designs and specifications, and evaluate whether the design is as expected, if any design changes have affected the validity of our recommendations, and if our recommendations have been correctly interpreted and implemented in the designs and specifications.

F.2.b. Construction Observations and Testing

It is recommended that we be retained to perform observations and tests during construction. This will allow correlation of the subsurface conditions encountered during construction with those encountered by the borings, and provide continuity of professional responsibility.

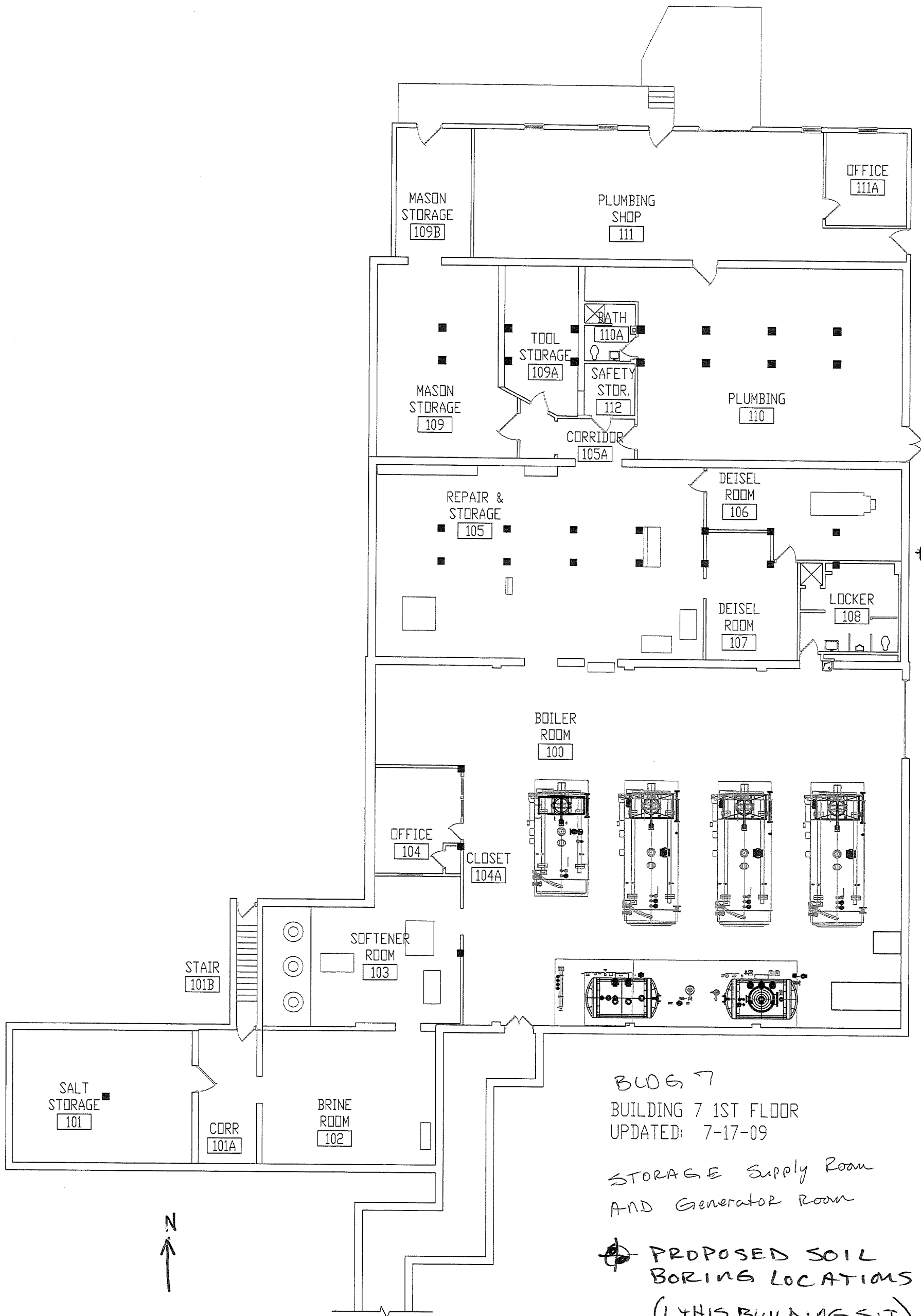
F.3. Use of Report

This report is for the exclusive use of the parties to which it has been addressed. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

F.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix



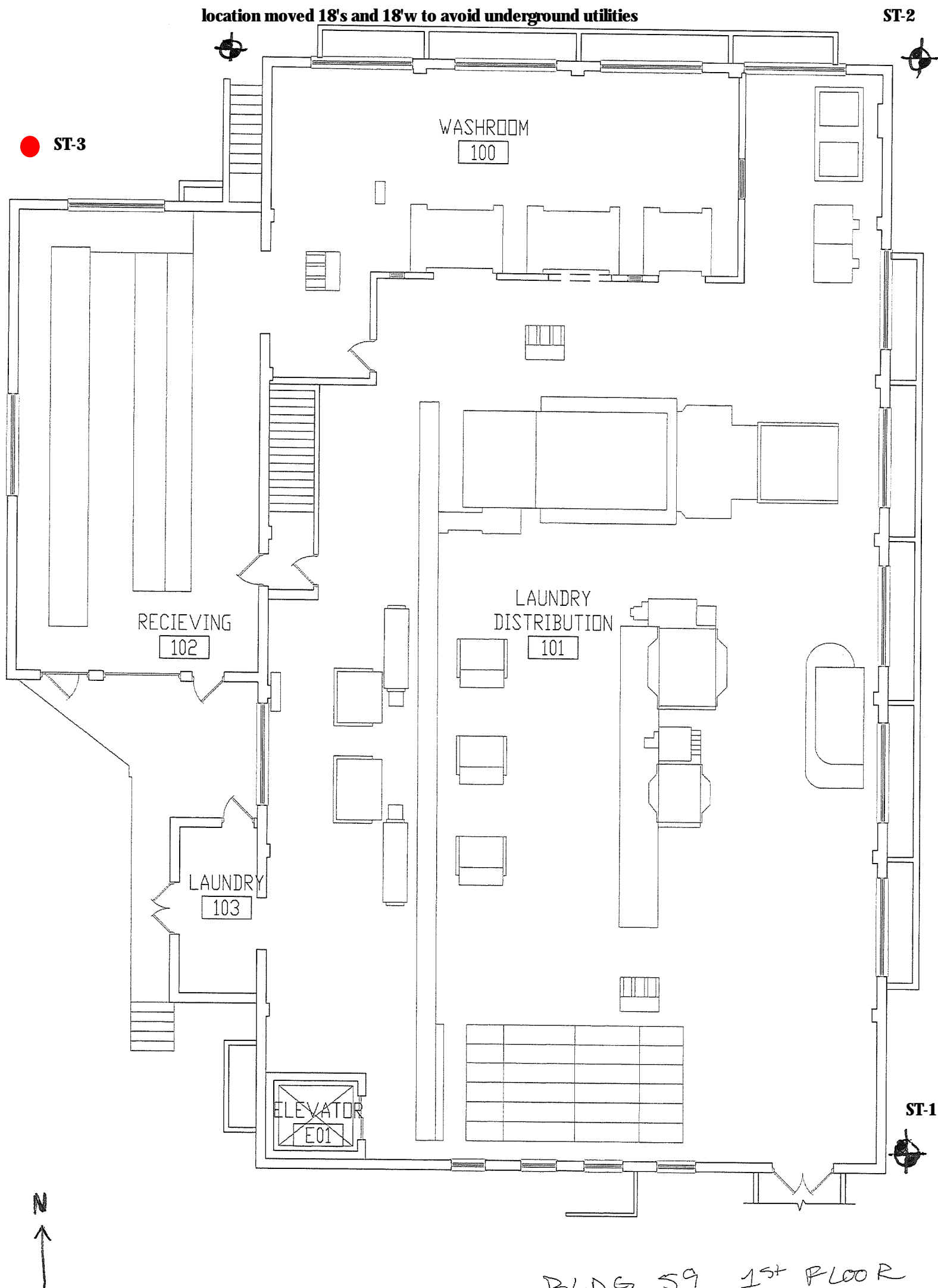
ST-4
 PROPOSED SOIL BORING LOCATION

BLOG 7
 BUILDING 7 1ST FLOOR
 UPDATED: 7-17-09

STORAGE Supply Room
 AND Generator Room

PROPOSED SOIL BORING LOCATIONS
 (1 THIS BUILDING SIT)

location moved 18's and 18'w to avoid underground utilities



BLDG 59 1st FLOOR

⊕ PROPOSED SOIL BORING LOCATIONS (3 THIS BUILDING SITE)

- KEY NOTES:**
- NEW MAKE-UP AIR VENT W/ GOOSENECK TO MATCH EXISTING (SEE DETAIL SHEET C-7). OWNER SHALL PROVIDE AND INSTALL EXHAUST FAN TO OSHA STANDARDS.
 - NEW TUNNEL VENT LOCATION. NEW MAKE-UP AIR VENT W/ GOOSENECK - 2' X 3' (SEE DETAIL SHEET C-7). OWNER SHALL PROVIDE AND INSTALL EXHAUST FAN TO OSHA STANDARDS.
 - NEW W8X31 I-BEAM.
 - HIGH VOLTAGE CROSSING.
 - 2 1/2" ELECTRICAL CONDUIT CROSSING AT STA. 1+28.
 - PHONE LINE PENETRATION OF TUNNEL TOP AT STA. 1+18.
 - 2 1/2" CONDUIT CROSSING TUNNEL AT STA. 0+55.
 - VALVE PIT-NEW PRE CAST TUNNEL TOP TO WITHSTAND H-20 LOADING AND SHALL CONTAIN EYE HOOKS FOR FUTURE ACCESS.
 - NEW W8X31 I-BEAM.
 - NEW SUMP PUMP. 1 1/2" SCH.40 PVC PIPE TO BE CORE DRILLED THROUGH BUILDING 7 AND PIPED TO ADJACENT DOWNSPOUT. PATCH FLOOR AS NECESSARY.
 - NEW EAST TUNNEL WALL FROM STA. 0+06 TO STA. 1+98. TWO CONSTRUCTION JOINTS SPACED EVENLY ALONG EAST TUNNEL WALL.
 - NEW PRE CAST TUNNEL ROOF FROM STA. 0+00 TO STA. 2+10 EXCLUSIVE OF BLDG. 6 EXTENSIONS. ALL PRE CAST SECTIONS SHOULD BE DESIGNED TO WITHSTAND H-20 LOADING.
 - NEW WATER PROOF MEMBRANE:
 - INSTALLED ON TUNNEL TOP FROM STA. 0+00-2+27 (EXCLUSIVE OF BLDG. 6 EXTENSIONS)
 - INSTALLED ON ENTIRE DEPTH OF NEW EAST TUNNEL WALL FROM STA. 0+06-1+98.
 - INSTALLED ON 24" MIN. OF EX. EAST TUNNEL WALL FROM STA. 2+10-2+27
 - INSTALLED ON 24" MIN. OF EX. WEST TUNNEL WALL FROM STA. 0+00-0+22 (SEE DETAIL SHEET C-8 FOR AREAS ABUTTING BUILDINGS)

*IS THIS A COLO. VENT?
WE SHOULD DESIGN IT. DOES IT GET COVERED?
DO THE EXHAUST VENTS*

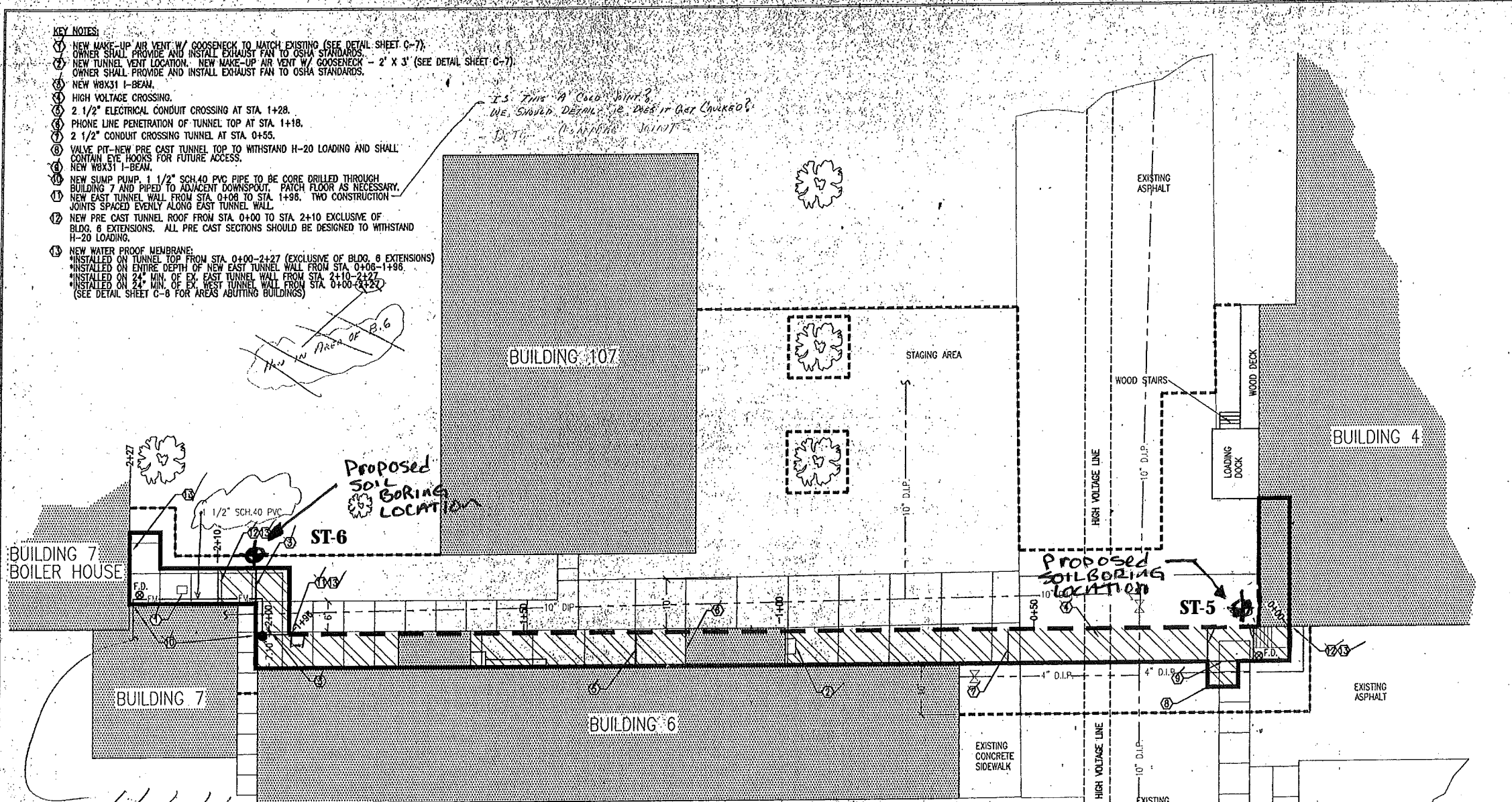
NEW IN AREA OF B.6

Proposed SOIL BORING LOCATION

Proposed SOIL BORING LOCATION

MAYBE SUMP PIT SHOULD BE ON EAST WALL

Proposed SOIL BORING LOCATIONS (2 AT TUNNEL LOCATION)



NEW TUNNEL SITE PLAN
SCALE: 1"=10'

LEGEND

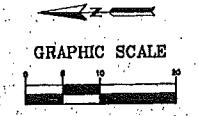
- EXISTING GATE VALVE
- EXISTING D.I.P. WATER MAIN
- NEW FORCE MAIN
- EXISTING TREE
- NEW PRE CAST TUNNEL ROOF (H-20 LOADING DESIGN)
- EXISTING BUILDING AREA
- NEW EAST TUNNEL WALL
- EXISTING TUNNEL WALL
- CONSTRUCTION LIMITS/6' CHAIN LINK FENCE (SEE NOTE #1)
- FLOOR DRAIN
- NEW SUMP PUMP

ESTIMATE OF REPLACEMENT QUANTITIES

PRE CAST TUNNEL TOP	1290 SF
OUTER TUNNEL WALL	1372 SF
REPLACE TUNNEL VENTS	2 EA.
STRUC. BEAMS (W8X31)	5 EA.

NOTE: QUANTITIES ARE APPROXIMATE, FOR BID PURPOSES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR ACTUAL QUANTITIES REQUIRED.

- NOTES:**
- PROVIDE 6' TEMPORARY CONSTRUCTION FENCE OF CHAIN LINK AT CONSTRUCTION LIMITS TO PROTECT THE SITE AS NECESSARY. COORDINATE WITH COIR.
 - EXISTING TUNNEL FLOOR AND WEST WALL TO REMAIN.
 - EXISTING TREES ARE TO BE UNDISTURBED DURING CONSTRUCTION.



Department of Veterans Affairs

LIGHTOWLER JOHNSON ASSOCIATES INCORPORATED ARCHITECTS ENGINEERS

1988 BY LIGHTOWLER JOHNSON ASSOCIATES INCORPORATED

FARGO, NORTH DAKOTA
WOODRIDGE, MINNESOTA

DATE: 2-27-99 REGISTRATION NUMBER: 14475

TUNNEL/LOADING DOCK REPAIR
V.A. MEDICAL CENTER
ST. CLOUD, MN

DRAWN BY: HGA/ABD/CSD
CHECKED BY: SOD
DATE: 10/29/99
PROJECT NO: 99238
REVISIONS: 12/3/99
CAD NAME: 99238-CS
CAD SCALE: 10

NEW TUNNEL SITE PLAN

SHEET NO:

C-3

3 OF 7



Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a				Soils Classification	
				Group Symbol	Group Name ^b
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels 5% or less fines ^e	$C_u \geq 4$ and $1 \leq C_c \leq 3$ ^c	GW	Well-graded gravel ^d
			$C_u < 4$ and/or $1 > C_c > 3$ ^c	GP	Poorly graded gravel ^d
		Gravels with Fines More than 12% fines ^e	Fines classify as ML or MH	GM	Silty gravel ^{d fg}
			Fines classify as CL or CH	GC	Clayey gravel ^{d fg}
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands 5% or less fines ⁱ	$C_u \geq 6$ and $1 \leq C_c \leq 3$ ^c	SW	Well-graded sand ^h
			$C_u < 6$ and/or $1 > C_c > 3$ ^c	SP	Poorly graded sand ^h
		Sands with Fines More than 12% ⁱ	Fines classify as ML or MH	SM	Silty sand ^{fg h}
			Fines classify as CL or CH	SC	Clayey sand ^{fg h}
Fine-grained Soils 50% or more passed the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line ^j	CL	Lean clay ^{k l m}
			PI < 4 or plots below "A" line ^j	ML	Silt ^{k l m}
		Organic	Liquid limit - oven dried < 0.75	OL	Organic clay ^{k l m n}
			Liquid limit - not dried < 0.75	OL	Organic silt ^{k l m o}
	Silts and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay ^{k l m}
			PI plots below "A" line	MH	Elastic silt ^{k l m}
		Organic	Liquid limit - oven dried < 0.75	OH	Organic clay ^{k l m p}
			Liquid limit - not dried < 0.75	OH	Organic silt ^{k l m q}
Highly Organic Soils	Primarily organic matter, dark in color and organic odor			PT	Peat

Particle Size Identification

Boulders over 12"
Cobbles 3" to 12"
Gravel
Coarse 3/4" to 3"
Fine No. 4 to 3/4"
Sand
Coarse No. 4 to No. 10
Medium No. 10 to No. 40
Fine No. 40 to No. 200
Silt < No. 200, PI < 4 or below "A" line
Clay < No. 200, PI ≥ 4 and on or above "A" line

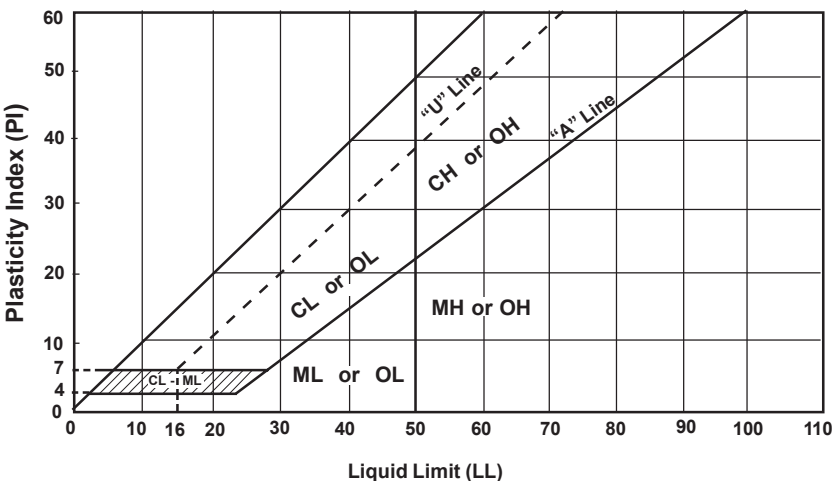
Relative Density of Cohesionless Soils

Very loose 0 to 4 BPF
Loose 5 to 10 BPF
Medium dense 11 to 30 BPF
Dense 31 to 50 BPF
Very dense over 50 BPF

Consistency of Cohesive Soils

Very soft 0 to 1 BPF
Soft 2 to 3 BPF
Rather soft 4 to 5 BPF
Medium 6 to 8 BPF
Rather stiff 9 to 12 BPF
Stiff 13 to 16 BPF
Very stiff 17 to 30 BPF
Hard over 30 BPF

- Based on the material passing the 3-in (75mm) sieve.
- If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
- $C_u = D_{60} / D_{10}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- If soil contains ≥ 15% sand, add "with sand" to group name.
- Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
- If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
- If fines are organic, add "with organic fines" to group name.
- If soil contains ≥ 15% gravel, add "with gravel" to group name.
- Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
- If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
- If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
- If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
- PI ≥ 4 and plots on or above "A" line.
- PI < 4 or plots below "A" line.
- PI plots on or above "A" line.
- PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	OC	Organic content, %
WD	Wet density, pcf	S	Percent of saturation, %
MC	Natural moisture content, %	SG	Specific gravity
LL	Liquid limit, %	C	Cohesion, psf
PL	Plastic limit, %	φ	Angle of internal friction
PI	Plasticity index, %	qu	Unconfined compressive strength, psf
P200	% passing 200 sieve	qp	Pocket penetrometer strength, tsf

Drilling Notes

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" ID hollow-stem augers unless noted otherwise, Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous-flight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the prefix "B."

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix "H."

BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

TW indicates thin-walled (undisturbed) tube sample.

Note: All tests were run in general accordance with applicable ASTM standards.

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\02230.GPJ BRAUN_V8_CURRENT.GDT 6/6/14 10:59

Braun Project B14-02230 Geotechnical Evaluation St. Cloud VA Foundations Repair Veterans Drive St. Cloud, Minnesota			BORING: ST-1 LOCATION: See sketch.				
DRILLER:	R. Hansen	METHOD:	3 1/4" HSA, Autohammer	DATE:	5/15/14	SCALE:	1" = 5'
Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes		
0.0	FILL	FILL: Silty Sand, fine-grained, dark brown, moist.					
			4				
			3				
7.5	SP	POORLY GRADED SAND, fine- to medium-grained, brown, moist, loose to medium dense. (Glacial Outwash)	14				
			9				
			19				
			28				
			23				
			9				
			11				
			23				
			36				
17.0	GP	POORLY GRADED GRAVEL, brown, waterbearing, medium dense to loose. (Glacial Outwash)	20	▽		An open triangle in the water level (WL) column indicates the depth at which groundwater was first observed while drilling.	
			31				
			7				
			13				
31.0		END OF BORING.					
		Water observed at 17 feet while drilling.					
		Water observed at 16 feet with 29 1/2 feet of hollow-stem auger in the ground.					
		Boring then backfilled.					

LOG OF BORING (See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\02230.GPJ BRAUN_V8_CURRENT.GDT 6/6/14 10:59

Braun Project B14-02230 Geotechnical Evaluation St. Cloud VA Foundations Repair Veterans Drive St. Cloud, Minnesota				BORING: ST-2 LOCATION: See sketch.	
DRILLER: R. Hansen		METHOD: 3 1/4" HSA, Autohammer		DATE: 5/16/14	SCALE: 1" = 5'
Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0	FILL	FILL: Silty Sand, fine- to medium-grained, black and dark brown, moist.			
			5		
			4		
8.0	SP	POORLY GRADED SAND, fine- to medium-grained, with Gravel, brown, moist, loose to medium dense. (Glacial Outwash)	7		
			13		
			32		
			26		
			31		
			9		
			15		
			12		
17.0	GP	POORLY GRADED GRAVEL, fine- to medium-grained, with Sand, gray and brown, waterbearing. (Glacial Outwash)	20	▽	
20.0	SP	POORLY GRADED SAND, fine- to medium-grained, with Gravel, brown to gray, waterbearing, dense to loose. (Glacial Outwash)	39		
			31		
31.0		END OF BORING.	6		
		Water observed at 17 1/2 feet while drilling.			
		Water observed at 16 feet with 29 1/2 feet of hollow-stem auger in the ground.			
		Boring then backfilled.			

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\02230.GPJ BRAUN_V8_CURRENT.GDT 6/6/14 10:59

Braun Project B14-02230 Geotechnical Evaluation St. Cloud VA Foundations Repair Veterans Drive St. Cloud, Minnesota				BORING: ST-3 LOCATION: See sketch.	
DRILLER: R. Hansen		METHOD: 3 1/4" HSA, Autohammer		DATE: 5/16/14	SCALE: 1" = 5'
Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0	FILL	FILL: Silty Sand, fine- to medium-grained, black, moist.			
4.0	SP	POORLY GRADED SAND, fine- to medium-grained, with Gravel, brown, moist to waterbearing at 18 feet, loose to dense. (Glacial Outwash)	7 9 16 20 45 44 36 13 15 15 26 19 37	▽	
24.0	GP	POORLY GRADED GRAVEL, brown, waterbearing, very dense to loose. (Glacial Outwash)	50/9"		
31.0		END OF BORING. Water observed at 18 feet while drilling. Water observed at 17 feet with 29 1/2 feet of hollow-stem auger in the ground. Boring then backfilled.	18		

(See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\02230.GPJ BRAUN_V8_CURRENT.GDT 6/10/14 16:48

Braun Project B14-02230 Geotechnical Evaluation St. Cloud VA Foundations Repair Veterans Drive St. Cloud, Minnesota			BORING: ST-4		
DRILLER: R. Hansen			METHOD: 3 1/4" HSA, Autohammer		
DATE: 5/14/14			SCALE: 1" = 5'		
Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0					
0.5	CONC	5" of Concrete.	5		
2.0	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, with Gravel, brown, moist.	7		
	SP	POORLY GRADED SAND, fine- to medium-grained, with Gravel, brown, moist, loose. (Glacial Outwash)	9		
			9		
			7		
6.0	SP	POORLY GRADED SAND, fine- to coarse-grained, with Gravel, rust, waterbearing, loose to medium dense. (Glacial Outwash)	7	▽	
			8		
			9		
			19		
			23		
12.0	GP	POORLY GRADED GRAVEL with SAND, gray, waterbearing, medium dense to dense. (Glacial Outwash)	22		
			35		
			47		
19.0	SP	POORLY GRADED SAND, fine-grained, with Gravel, gray, waterbearing, dense. (Glacial Outwash)	41		
			45		
			50		
26.0		END OF BORING.			
		Water observed at 6 feet while drilling.			
		Water observed at 25 feet with 24 1/2 feet of hollow-stem auger in the ground.			
		Boring then backfilled.			

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\02230.GPJ BRAUN_V8_CURRENT.GDT 6/6/14 10:59
 (See Descriptive Terminology sheet for explanation of abbreviations)

Braun Project B14-02230 Geotechnical Evaluation St. Cloud VA Foundations Repair Veterans Drive St. Cloud, Minnesota				BORING: ST-5 LOCATION: See sketch.	
DRILLER: R. Hansen		METHOD: 3 1/4" HSA, Autohammer		DATE: 5/12/14	SCALE: 1" = 5'
Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0					
0.3	BIT	3" of Bituminous.			
0.9	AGG	8" of Aggregate Base.			
	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, with Gravel, dark brown, moist.	8		
			11		
			10		
			9		
10.0	SP	POORLY GRADED SAND, fine- to medium-grained, with Gravel, brown, moist, medium dense. (Glacial Outwash)	20		
			23		
			39		
			24		
			28		
			21		
			32		
17.0	SP	POORLY GRADED SAND, coarse-grained, with Gravel, brown, waterbearing, medium dense. (Glacial Outwash)	11	▽	
			25		
22.0	GP	POORLY GRADED GRAVEL, brown, waterbearing, medium dense. (Glacial Outwash)	12		
			15		
31.0		END OF BORING.			
		Water observed at 17 1/2 feet while drilling.			
		Water observed at 17 feet with 29 1/2 feet of hollow-stem auger in the ground.			
		Boring then backfilled.			

LOG OF BORING (See Descriptive Terminology sheet for explanation of abbreviations)

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\02230.GPJ BRAUN_V8_CURRENT.GDT 6/6/14 10:59

Braun Project B14-02230 Geotechnical Evaluation St. Cloud VA Foundations Repair Veterans Drive St. Cloud, Minnesota			BORING: ST-6 LOCATION: See sketch.		
DRILLER: R. Hansen	METHOD: 3 1/4" HSA, Autohammer	DATE: 5/15/14	SCALE: 1" = 5'		
Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0	FILL	FILL: Silty Sand, fine-grained, black, moist.			
3.0	SP	POORLY GRADED SAND, fine- to medium-grained, with Gravel, brown, moist, medium dense to loose. (Glacial Outwash)	5 5 6 20 30 17 25 9 13 6 12 13		
19.0	GP	POORLY GRADED GRAVEL, brown, waterbearing, dense to medium dense. (Glacial Outwash)	50 17	▽	
31.0		END OF BORING. Water observed at 18 1/2 feet while drilling. Water observed at 16 feet with 29 1/2 feet of hollow-stem auger in the ground. Boring then backfilled.	20		

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November 25, 2014



*Providing Trusted
Health & Safety Solutions*

Evan Aljoe
LHB, Inc.
701 Washington Avenue North
Suite 200
Minneapolis, MN 55401

**RE: SCVAMC Repair Foundations
Asbestos and Lead Materials Inspection
IEA Project #201410242**

Dear Evan,

Enclosed please find two inspection reports for the above-referenced location.

If you have any questions or require further assistance, please do not hesitate to contact me at 763-315-7900.

Sincerely,

IEA, Inc.

William Dold
Senior Project Manager

WD/wb 112514

Enc.

cc File

INSTITUTE FOR ENVIRONMENTAL ASSESSMENT, INC.
www.ieasafety.com

BROOKLYN PARK
9201 West Broadway, #600
Brooklyn Park, MN 55445
763-315-7900 / FAX 763-315-7920
800-233-9513

MANKATO
610 North Riverfront Drive
Mankato, MN 56001
507-345-8818 / FAX 507-345-5301
800-233-9513

ROCHESTER
210 Woodlake Drive SE
Rochester, MN 55904
507-281-6664 / FAX 507-281-6695
800-233-9513

BRAINERD
13432 Elmwood Drive, Ste. #5
Baxter, MN 56425
218-454-0703 / FAX 218-454-0703
800-233-9513

OMAHA
7887 "L" Street
Ralston, NE 68127
402-339-6240 / FAX 402-339-7504
800-233-9513

**ASBESTOS AND LEAD
MATERIALS INSPECTION
PROFILE**

**ST. Cloud VA Medical Center
Buildings 4, 7 and 59
7801 Veterans Drive
St. Cloud, MN 56303**

November 25, 2014

Submitted to:

**Evan Aljoe
LHB, Inc.**

***Submitted by:
Institute for Environmental Assessment
9201 West Broadway North, Suite 600
Brooklyn Park, MN 55445-1922***

763-315-7900 / 800-233-9513

IEA Project #201410242

INDEX

SECTION I

- Asbestos Summary and Inspection Report

SECTION II

- Asbestos Sample Locations Drawings

SECTION III

- Asbestos Laboratory Report

SECTION IV

- Lead-Based Paint Inspection Summary

SECTION V

- Lead-Based Paint Inspection Report and Drawings

SECTION VI

- Asbestos and Lead Inspector's Licenses

SECTION I

Asbestos Summary and Inspection Report

Asbestos Summary
St. Cloud VA Medical Center
Buildings 4, 7, and 59
4801 Veterans Drive
St. Cloud, MN 56303

On October 30, 2014, an inspection for asbestos-containing materials (ACM) was performed at the above-referenced location. The scope of the inspection was limited to suspect ACM within the following areas: All suspect ACM affected by Repair Foundation renovation project. Drawings were provided by LHB, Inc.

Identified materials assumed to be ACM include the following:

- ◆ Below grade waterproofing (was inaccessible and assumed to be present)

Specific locations of these materials, as well as those suspect materials which were analyzed and were found not to contain asbestos, are identified in the attached report.

This inspection meets the requirements of the Minnesota Pollution Control Agency (MPCA) and Minnesota OSHA (MNOSHA) for an asbestos demolition/renovation inspection.

Bulk samples of accessible suspect material were collected and analyzed in accordance with Environmental Protection Agency (EPA) sampling and analytical procedure requirements. Sampling was conducted in a manner determined by the inspector to be sufficient to identify whether the suspect materials are asbestos containing.

The purpose of the inspection was to identify all suspect materials that may contain asbestos prior to demolition. Any suspect materials not identified on the survey that are uncovered prior to demolition should be assumed to contain asbestos or sampled.

GENERAL COMMENTS

The report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted practices. Other than as provided in the preceding sentence and in the Request for Services dated April 1, 2014, regarding Hazardous Materials Assessments at St. Cloud VA Medical Center, including the General Conditions attached thereto, no warranties are extended or made.

LHB, INC.

Asbestos Inspection Report for

St. Cloud VA Medical Center

Located at:

4801 Veterans Drive

St. Cloud, MN 56303

Conducted On: 10/30/2014

Conducted By: William Dold

Key (% of Asbestos)

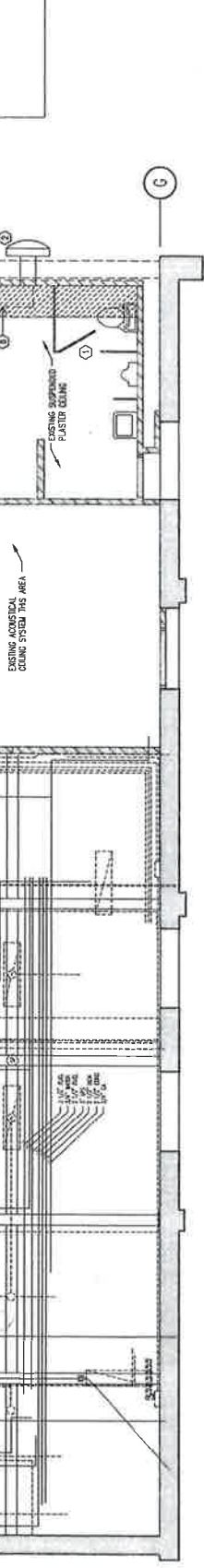
CH	=	Chrysotile	None Detected	=	Materials that have been tested and have been found to not contain asbestos.
AM	=	Amosite		=	
CR	=	Crocidolite	NSM	=	Nonsuspect material
ACT	=	Actinolite			
TR	=	Tremolite			
ANT	=	Anthophyllite			
Assumed	=	Suspect materials that have not been tested			

IEA Event No.	IEA Material Type	Location	Estimated Amount Total	% of Asbestos
1	X0A Miscellaneous Material 4" x 4" Ceramic Wall Tile Setting Bed	BUILDING 7 - ROOM 108	200 SF	NONE DETECTED
Comments: Sample # 103014BD-1				
2	X0B Miscellaneous Material 4" x 4" Ceramic Wall Tile Grout	BUILDING 7 - ROOM 108	40 SF	NONE DETECTED
Comments: Sample # 103014BD-2				
3	M0A Plaster Ceiling	BUILDING 7 - ROOM 108	200 SF	NONE DETECTED
Comments: Sample # 103014BD-8,9,10				
4	I2A 2' x 2' Acoustical Ceiling Tile Small Fissures w/ Pin Holes	BUILDING 7 - ROOM 107	275 SF	NONE DETECTED
Comments: Sample # 103014BD-11				

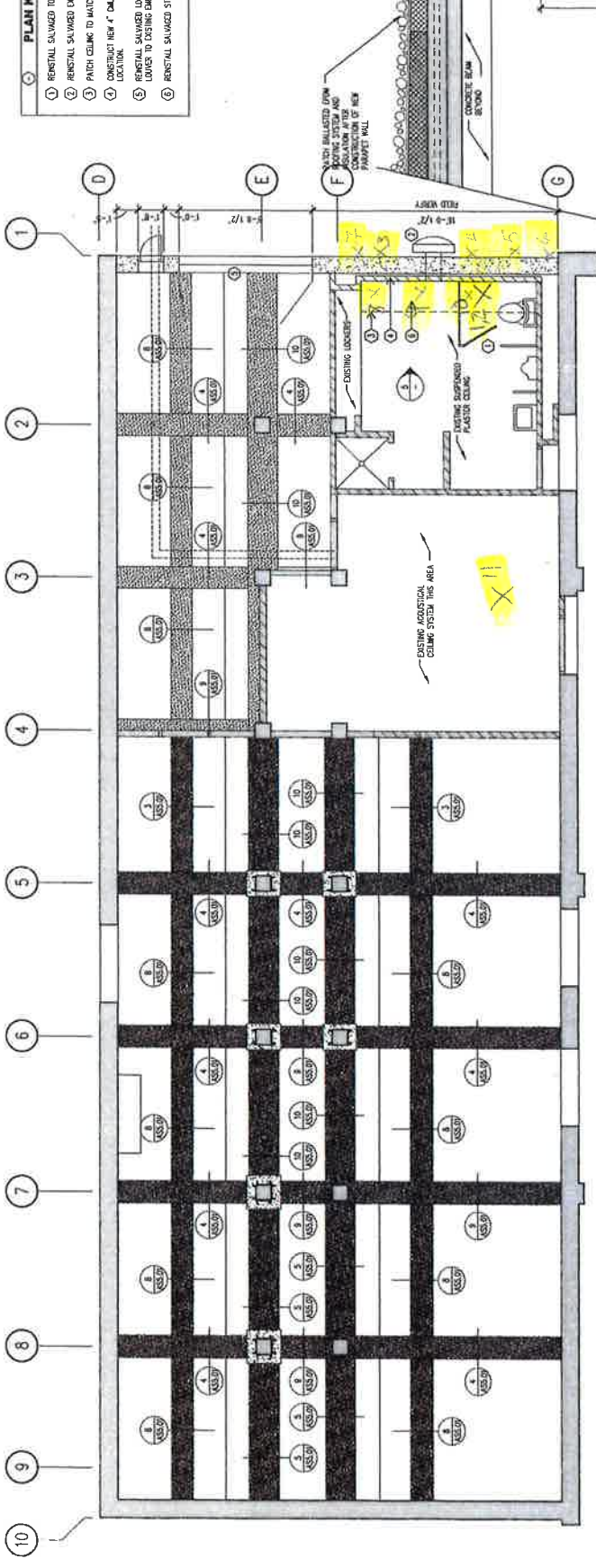
IEA Event No.	IEA Material Type	Location	Estimated Amount Total	% of Asbestos
5	M0B Plaster Exterior Stucco	BUILDING 7 - EXTERIOR OUTSIDE ROOM 108	300 SF	NONE DETECTED
Comments: Sample # 103014BD-3,4,5				
6	Y0A Miscellaneous Material Exterior Caulking	BUILDING 7 - EXTERIOR OUTSIDE ROOM 108	3 SF	NONE DETECTED
Comments: Sample # 103014BD-6				
7	Z0A Miscellaneous Material Exterior Miscellaneous Patching Material	BUILDING 7 - EXTERIOR OUTSIDE ROOM 108	20 SF	NONE DETECTED
Comments: Sample # 103014BD-7				
8	M0C Plaster Exterior Mortar	BUILDING 59 - EXTERIOR	80 SF	NONE DETECTED
Comments: Sample # 103014BD-12				
9	X1A Miscellaneous Material Below-Grade Waterproofing	BUILDING 4 - EXTERIOR	900 SF	ASSUMED
Comments: INACCESSIBLE ASSUMED TO BE PRESENT BELOW GRADE. Sample #				

SECTION II

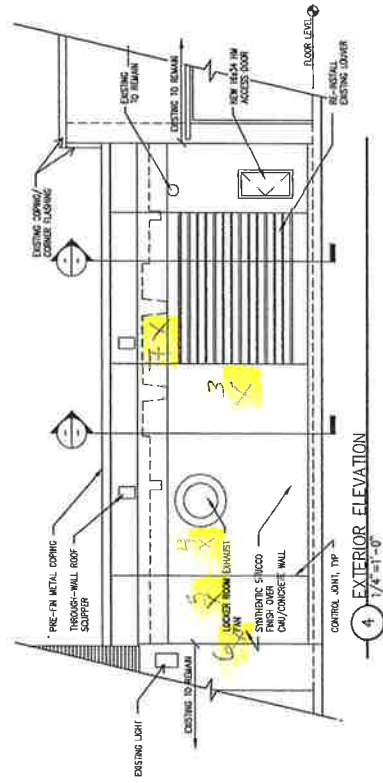
Asbestos Sample Locations Drawings



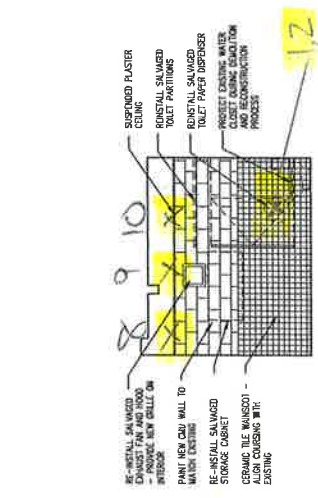
1 DEMOLITION / UTILITY REFERENCE CEILING PLAN
1/4"=1'-0"



3 REMODEL / CEILING PLAN
1/4"=1'-0"



4 EXTERIOR ELEVATION
1/4"=1'-0"



5 LOCKER ROOM ELEVATION
1/4"=1'-0"

6 WALL SECTION
3/4"=1'-0"

- PLAN KEY**
- 1 REINSTALL SALVAGED DRAIN
 - 2 REINSTALL SALVAGED DRAIN
 - 3 PATCH CEILING TO MATCH A LOCATION
 - 4 CONCRETE NEW 4" DIA. W/ LOCATIONS
 - 5 REINSTALL SALVAGED LOWER TO EXISTING ENERGY
 - 6 REINSTALL SALVAGED STAIR

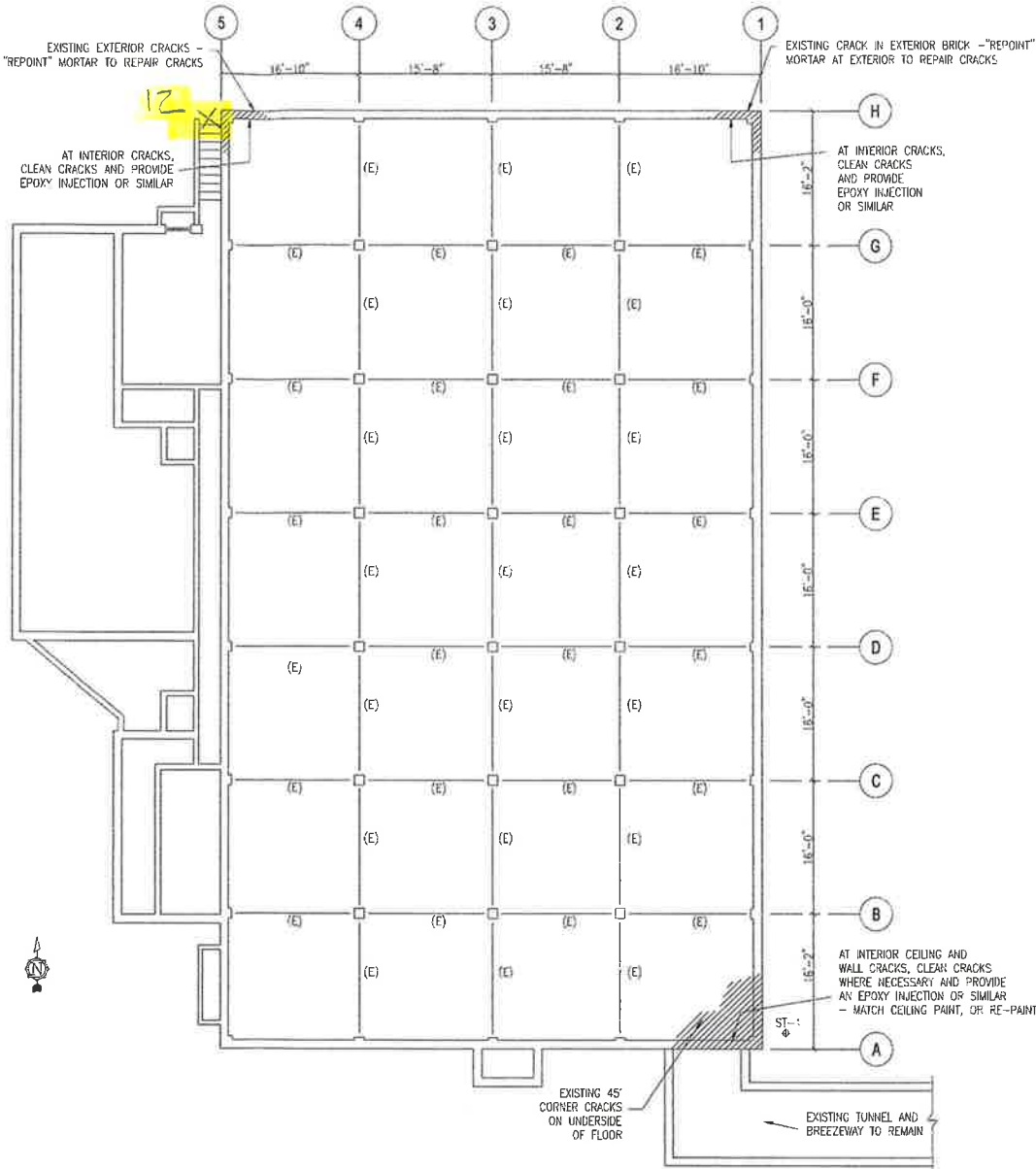
Asbestos Bulk Sample Locations

PERFORMANCE CONSULTING DESIGN
1200 Wisconsin Ave. E. Ste. 2017 Minneapolis, MN 55414-1200

TS&C Technical Services & Consulting, LLC
1225 TOWER AVE
SUPERIOR, WI 54880
715-392-1879

TECHNICAL SERVICES AND CONSULTING
1225 TOWER AVE
SUPERIOR, WI 54880
715-392-1879

NO.	REVISION	DATE



BUILDING 59 FIRST FLOOR FRAMING PLAN 1/8" = 1'-0"

NOTES:

1. PROVIDE (7) "MICROPILES" AT APPROXIMATE LOCATIONS AS SHOWN
2. LOCATIONS OF "MICROPILES" ARE TO BE FIELD VERIFIED (F.V.) ONCE FOUNDATIONS ARE EXPOSED AND ONCE FINAL CONDITIONS ARE KNOWN ENGINEER OF RECORD TO APPROVE FINAL LAYOUT.
3. ALL "MICROPILES" SHALL BE DESIGNED BY A MINNESOTA REGISTERED ENGINEER EMPLOYED BY THE PIER FABRICATOR/INSTALLER. CALCULATIONS BEARING THE ENGINEER'S STAMP AND SIGNATURE SHALL ACCOMPANY THE SHOP DRAWINGS. PILES SHALL BE DESIGNED AND DENOTED ON THE DRAWINGS AND PER THE SOILS REPORT DATED JUNE 10, 2014 BY BRAUN INTERTEC CORPORATION.
4. FOR STRUCTURAL GENERAL NOTES, SHEET SS100
5. ** MICROPILES #2, 3 & 4 MAY NEED TO BE INSTALLED WITHIN THE TUNNEL CONTRACTOR TO LAYOUT BEST FEASIBLE OPTION PRIOR TO CONSTRUCTION.
6. REFER TO ARCHITECTURAL FOR ELEVATION AND GRADE CHANGES

Asbestos Bulk Sample Locations

LOG OF B.C.

PROJECT INFORMATION		DATE	
PROJECT NO.	DATE	DATE	DATE
PROJECT NO. 15-0000	DATE 06/10/14	DATE 06/10/14	DATE 06/10/14
<p>PROJECT: 15-0000 - FOUNDATION REPAIR</p> <p>CLIENT: ST. CLOUT HEALTH CENTER</p> <p>LOCATION: 1225 TOWER AVE, SUPERIOR, WI 54880</p> <p>DATE: 06/10/14</p> <p>BY: [Signature]</p>			
DEPTH	DESCRIPTION	REMARKS	DATE
0'-0"	GROUND SURFACE		06/10/14
1'-0"	GRAVEL		06/10/14
2'-0"	CLAY		06/10/14
3'-0"	CLAY		06/10/14
4'-0"	CLAY		06/10/14
5'-0"	CLAY		06/10/14
6'-0"	CLAY		06/10/14
7'-0"	CLAY		06/10/14
8'-0"	CLAY		06/10/14
9'-0"	CLAY		06/10/14
10'-0"	CLAY		06/10/14
11'-0"	CLAY		06/10/14
12'-0"	CLAY		06/10/14
13'-0"	CLAY		06/10/14
14'-0"	CLAY		06/10/14
15'-0"	CLAY		06/10/14
16'-0"	CLAY		06/10/14
17'-0"	CLAY		06/10/14
18'-0"	CLAY		06/10/14
19'-0"	CLAY		06/10/14
20'-0"	CLAY		06/10/14
21'-0"	CLAY		06/10/14
22'-0"	CLAY		06/10/14
23'-0"	CLAY		06/10/14
24'-0"	CLAY		06/10/14
25'-0"	CLAY		06/10/14
26'-0"	CLAY		06/10/14
27'-0"	CLAY		06/10/14
28'-0"	CLAY		06/10/14
29'-0"	CLAY		06/10/14
30'-0"	CLAY		06/10/14

BORING LOG AT LOCATION ST-1 BY BRAUN INTERTEC - FOR COMPLETE TO THE SOILS REPORT DATED JUNE 10, 2014



TECHNICAL SERVICES AND CONSULTING
1225 TOWER AVE
SUPERIOR, WI 54880
715-392-1879

PROJECT NO.	DATE	DATE	DATE
15-0000	06/10/14	06/10/14	06/10/14
PROJECT NO.	DATE	DATE	DATE
15-0000	06/10/14	06/10/14	06/10/14
PROJECT NO.	DATE	DATE	DATE
15-0000	06/10/14	06/10/14	06/10/14
PROJECT NO.	DATE	DATE	DATE
15-0000	06/10/14	06/10/14	06/10/14
PROJECT NO.	DATE	DATE	DATE
15-0000	06/10/14	06/10/14	06/10/14



SECTION III

Asbestos Laboratory Report

**EMSL Analytical, Inc.**

14375 23rd Avenue North, Minneapolis, Mn 55447
 Phone/Fax: (763) 449-4922 / (763) 449-4924
<http://www.EMSL.com> minneapolislab@emsl.com

EMSL Order: 351406756
 CustomerID: IFEA50
 CustomerPO:
 ProjectID:

Attn: **Denice Kuchta** Phone: (763) 315-7900
Inst. For Environmental Assessment Fax: (763) 315-7920
9201 West Broadway Received: 10/30/14 1:50 PM
Suite 600 Analysis Date: 11/4/2014
Brooklyn Park, MN 55445 Collected: 10/30/2014
 Project: 201410242

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
103014-BD-1 351406756-0001	B-7, Rm 108 - Wall Tile Setting Bed	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-2 351406756-0002	B-7, Rm 108 - Wall Tile Grout	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-3 351406756-0003	B-7, Exterior Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-4 351406756-0004	B-7, Exterior Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-5 351406756-0005	B-7, Exterior Stucco	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-6 351406756-0006	B-7, Exterior Caulk	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-7 351406756-0007	B-7, Exterior Misc. Patch Material	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-8 351406756-0008	B-7, Room 108 - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-9 351406756-0009	B-7, Room 108 - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%
 Samples analyzed by EMSL Analytical, Inc. Minneapolis, Mn NVLAP Lab Code 200019-0

Initial report from 11/04/2014 11:11:11

**EMSL Analytical, Inc.**

14375 23rd Avenue North, Minneapolis, Mn 55447
 Phone/Fax: (763) 449-4922 / (763) 449-4924
<http://www.EMSL.com> minneapolislab@emsl.com

EMSL Order: 351406756
 CustomerID: IFEA50
 CustomerPO:
 ProjectID:

Attn: **Denice Kuchta**
Inst. For Environmental Assessment
9201 West Broadway
Suite 600
Brooklyn Park, MN 55445

Phone: (763) 315-7900
 Fax: (763) 315-7920
 Received: 10/30/14 1:50 PM
 Analysis Date: 11/4/2014
 Collected: 10/30/2014

Project: **201410242**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
103014-BD-10 351406756-0010	B-7, Room 108 - Ceiling Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-11-Texture 351406756-0011	B-7, Rm 107 - 2x2 Ceiling Tile, Sm Fissures w/Pinh	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
103014-BD-11-Ceiling Tile 351406756-0011A	B-7, Rm 107 - 2x2 Ceiling Tile, Sm Fissures w/Pinh	Gray Fibrous Homogeneous	40% Cellulose 40% Glass	20% Perlite 0% Non-fibrous (other)	None Detected
103014-BD-12 351406756-0012	B-59, Exterior Mortar	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%
 Samples analyzed by EMSL Analytical, Inc. Minneapolis, Mn NVLAP Lab Code 200019-0

Initial report from 11/04/2014 11:11:11



EMSL Analytical, Inc.

14375 23rd Avenue North, Minneapolis, Mn 55447
Phone/Fax: (763) 449-4922 / (763) 449-4924
<http://www.EMSL.com> minneapolislab@emsl.com

EMSL Order: 351406756
CustomerID: IFEA50
CustomerPO:
ProjectID:

Attn: **Denice Kuchta**
Inst. For Environmental Assessment
9201 West Broadway
Suite 600
Brooklyn Park, MN 55445

Phone: (763) 315-7900
Fax: (763) 315-7920
Received: 10/30/14 1:50 PM
Analysis Date: 11/4/2014
Collected: 10/30/2014

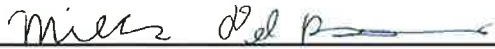
Project: 201410242

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.


Report Comments:

Sample Receipt Date:: 10/30/2014 Sample Receipt Time: 1:50 PM
Analysis Completed Date: 11/4/2014 Analysis Completed Time: 10:56 AM

Analyst(s):


Miles DelBusso PLM (13)

Samples reviewed and approved by:


Rachel Travis, Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%
Samples analyzed by EMSL Analytical, Inc. Minneapolis, Mn NVLAP Lab Code 200019-0

Initial report from 11/04/2014 11:11:11

6756

CHAIN OF CUSTODY

Page 1 of 1

9201 West Broadway North, Suite 600
 Brooklyn Park, MN 55445
 (763) 315-7900
 1-800-233-9513

Client # _____ Project # 2041024Z Building Name _____ Shaded Areas are for Laboratory Use Only!

Client LHB Project Name REPAIR FOUNDATIONS Contact Person Phone _____

Address _____ Contact Person _____ Other Information _____

Verbal results to _____ Phone, Fax No. or E-Mail _____ TAT (circle) 6 hr 1d 2d 3d 4d Specify _____

Verbal results relayed to _____ Verbal results relayed by _____ Date _____ Time _____

Analysis location: On Site Lab Regional Office Other _____

Sample #	Work Area or Phase #	Comments / Location	Sample type or Material code	Volume	Matrix type			Analysis requested				Filter type					
					Air	Bulk	Dust	PCM	PLM	TEM	Other	MCE	.8 um	.45 um			
103014-BD-1	B-7	Rm 108 - WALL TILE Setting Bed			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-2		Rm 108 - WALL TILE GROUT			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-3		EXTERIOR STUCCO	ANALYZE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-4			SUBMIT LIST		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-5			POSITIVE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-6		EXTERIOR CAULK			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-7		EXTERIOR MISC. PATCH MATERIAL			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-8		ROOM 108 - CEILING PLASTER	ANALYZE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-9			SUBMIT LIST		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-10			POSITIVE		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-11		Rm 107-2x2 Ceiling Tile Samples w/ Pinholes			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103014-BD-12	B-59	EXTERIOR MORTAR			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The MN Department of Health Alternative Indoor Air Standard for this project is: _____ F/CC: _____ Batch Number: _____

Sampled by	Date	Time	Delivered by	Date	Time	Received by lab	Date	Time	Entered by	Date	Time	Samples Acceptable?	Yes	No
Wm Dole	10/30/14	NOON	Wm Dole	10/30/14	11:50	_____	10/30/14	1:50 PM	WT	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	
Received by	Date	Time	Delivered by	Date	Time	Analysis by	Date	Time	Delivered by	Date	Time	<input type="checkbox"/>	<input type="checkbox"/>	

SECTION IV

Lead-Based Paint Inspection Summary

LEAD-BASED PAINT INSPECTION SUMMARY

Inspection for: LHB, Inc.

Performed at: St. Cloud VA Medical Center, 4801 Veterans Drive, St. Cloud, Minnesota, 56303

Performed by: Michael Voss, Institute for Environmental Assessment

Inspection Dates: November 6, 2014

Instrument Used: Thermo Fisher Scientific Niton Corporation X-Ray Fluorescence (XRF) Analyzer

Serial Number: 16071

Standard: 1.0 mg/cm²

The inspection was conducted in accordance with the U.S. Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint in Housing. All surfaces affected by the renovation were inspected. Drawings were provided by LHB, Inc.

A total of twenty-two (22) surfaces were analyzed for lead content utilizing the XRF Analyzer. All samples were given a result of positive or negative for lead (above or below 1.0 mg/cm²), the standard established by the Minnesota Department of Health (MDH) and HUD for lead in paint. Results are located in Section V.

Rooms were given number designations for identification. Maps with room numbers are located in Section V.

No lead-based paint was detected.

For purposes of renovation, the renovation contractor must be notified of the lead content in paint. It is the contractor's responsibility to comply with OSHA's Lead in Construction "Interim Final Rule" 29 CFR 1926.62. OSHA does not acknowledge the standards established by MDH and HUD and regulates any amount of lead in paint.

Calibration check tests were conducted throughout the inspection using standards with a known lead content of 0.0 mg/cm² to 3.5 mg/cm².

GENERAL COMMENTS

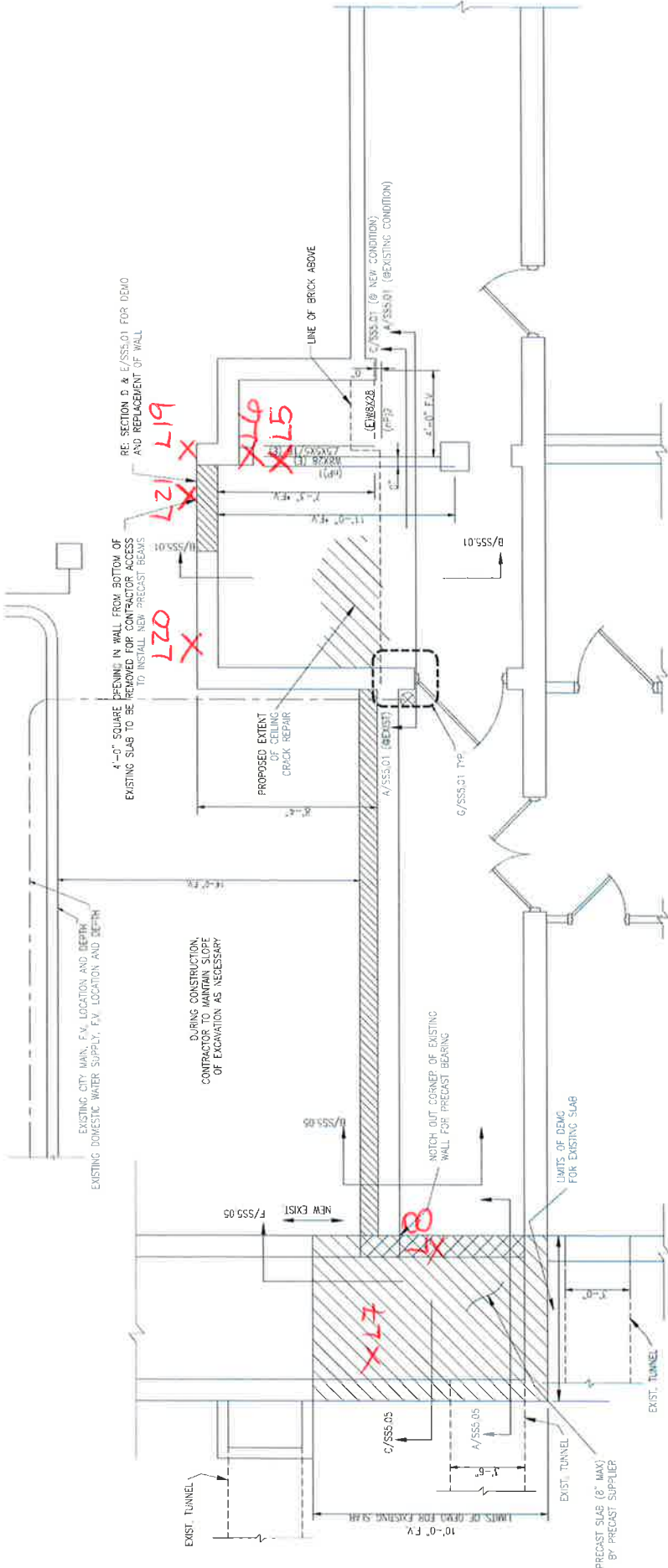
The analysis and opinions expressed in this report are based upon data obtained from St. Cloud VA Medical Center at the indicated locations. This report does not reflect variations in conditions that may occur across the site, property, or facility. Actual conditions may vary and may not become evident without further assessment.

The report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted practices. Other than as provided in the preceding sentence and in the Request for Services dated April 1, 2014, regarding Hazardous Materials at St. Cloud VA Medical Center, including the General Conditions attached thereto, no warranties are extended or made.

SECTION V

Lead-Based Paint Inspection Report and Drawing

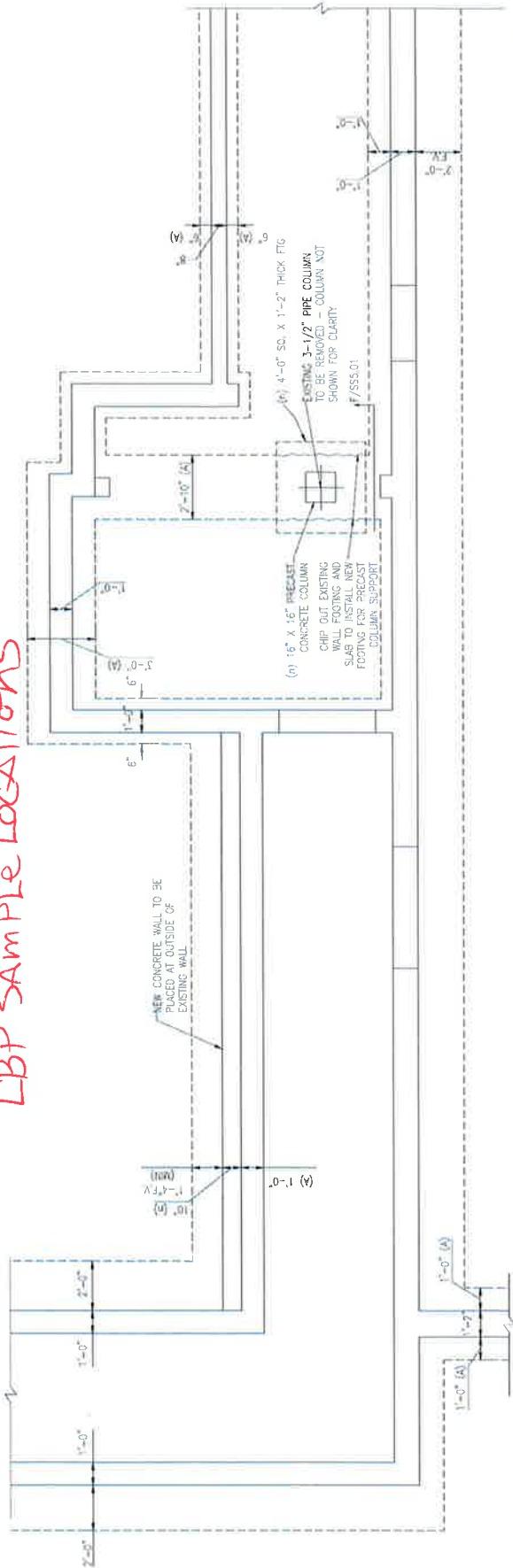
No	Time	Duration	COMPONENT	SUBSTRATE	SIDE	CONDITION	COLOR	SITE	ROOM	Res	EScale1	Esclct	Results	DI	PbC	PbC Error
1	11/6/2014 9:11	128.38								433.36	4.57	2.32			3.34	0
2	11/6/2014 9:13	19.8	CALIBRATE				RED						Positive	1.04	1	0.1
3	11/6/2014 9:14	20	CALIBRATE				RED						Positive	2.53	1	0.1
4	11/6/2014 9:15	6.61	CALIBRATE				RED						Negative	1	0.9	0.1
5	11/6/2014 9:29	1.1	BEAM	METAL		POOR	RED	BLDG 4	TUNNEL MECH				Negative	1	< LOD	0.03
6	11/6/2014 9:30	1.09	BEAM SUPPORT	METAL		POOR	RED	BLDG 4	TUNNEL MECH				Negative	1	< LOD	0.03
7	11/6/2014 9:34	1.1	BEAM	METAL		POOR	SILVER	BLDG 4	TUNNEL				Negative	1	< LOD	0.03
8	11/6/2014 9:34	1.1	BEAM	METAL		POOR	SILVER	BLDG 4	TUNNEL				Negative	1.1	< LOD	0.03
9	11/6/2014 9:44	6.15	WALL	CONCRETE	D	INTACT	WHITE	BLDG 7	RM 105				Negative	3.62	< LOD	0.9
10	11/6/2014 9:46	2.64	CEILING	CONCRETE		POOR	WHITE	BLDG 7	RM 106				Negative	2.36	< LOD	0.06
11	11/6/2014 9:49	3.28	CEILING	PLASTER		INTACT	WHITE	BLDG 7	RM 108				Negative	1	< LOD	0.03
12	11/6/2014 9:49	3.31	WALL	CONCRETE BLOCK		INTACT	WHITE	BLDG 7	RM 108				Negative	1	< LOD	0.03
13	11/6/2014 9:50	2.43	WALL	CERAMIC TILE		INTACT	BLUE	BLDG 7	RM 108				Negative	7.59	< LOD	0.65
14	11/6/2014 9:50	1.54	FLOOR	CERAMIC TILE		INTACT	BLUE	BLDG 7	RM 108				Negative	1	< LOD	0.03
15	11/6/2014 9:55	3.29	CEILING	CONCRETE		POOR	BLACK	BLDG 7	RM 101				Negative	1.55	< LOD	0.03
16	11/6/2014 9:55	2.19	CEILING	CONCRETE		POOR	BLACK	BLDG 7	RM 101				Negative	3.07	< LOD	0.1
17	11/6/2014 10:02	3.5	WALL	CONCRETE	B	FAIR	TAN	BLDG 7	EXT EAST				Negative	5.89	< LOD	0.17
18	11/6/2014 10:07	1.11	ROOF FLASHING	METAL	D	INTACT	BROWN	BLDG 7	EXT WEST				Negative	1	< LOD	0.05
19	11/6/2014 10:11	2.42	LOADING DOCK	METAL	A	POOR	YELLOW	BLDG 4	EXT NORTH				Negative	2.77	0.6	0.3
20	11/6/2014 10:12	1.11	LOADING DOCK	METAL	A	POOR	YELLOW	BLDG 4	EXT NORTH				Negative	1	< LOD	0.08
21	11/6/2014 10:12	1.98	LOADING DOCK	CONCRETE	A	FAIR	TAN	BLDG 4	EXT NORTH				Negative	1	< LOD	0.03
22	11/6/2014 10:20	1.32	CEILING	CONCRETE	A	INTACT	WHITE	BLDG 59	RM 5 SE				Negative	1	< LOD	0.05
23	11/6/2014 10:20	2.42	WALL	CONCRETE	B	INTACT	WHITE	BLDG 59	RM 5 SE				Negative	1.02	< LOD	0.03
24	11/6/2014 10:21	2.84	WALL	CONCRETE	C	INTACT	WHITE	BLDG 59	RM 5 SE				Negative	1	< LOD	0.03
25	11/6/2014 10:27	3.97	FOUNDATION WALL	CONCRETE	A	INTACT	TAN	BLDG 59	EXT NW				Negative	1	< LOD	0.03
26	11/6/2014 10:28	2.42	FOUNDATION WALL	CONCRETE	A	INTACT	TAN	BLDG 59	EXT NE				Negative	1	< LOD	0.03
27	11/6/2014 10:36	19.85	CALIBRATE				RED						Positive	1.05	1	0.1
28	11/6/2014 10:37	20	CALIBRATE				RED						Null	2.59	1	0.1
29	11/6/2014 10:38	8.16	CALIBRATE				RED						Positive	1.08	1.1	0.1

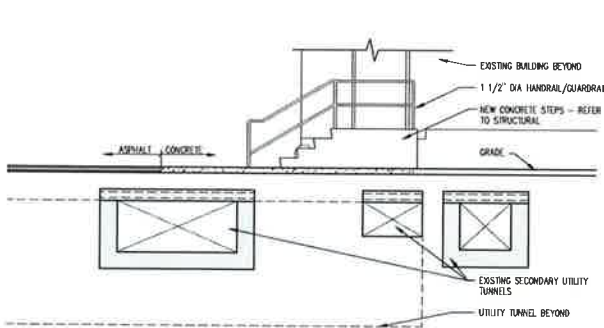


SHOWS EXTENT OF PRECAST
"10" RE: SECTIONS A&F/SSS.05

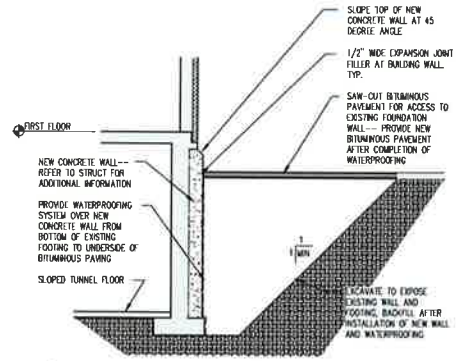
PRECAST SLAB (8" MAX.)
BY PRECAST SUPPLIER

Building 4
B AREA 3/8" = 1'-0"
LBP SAMPLE LOCATIONS

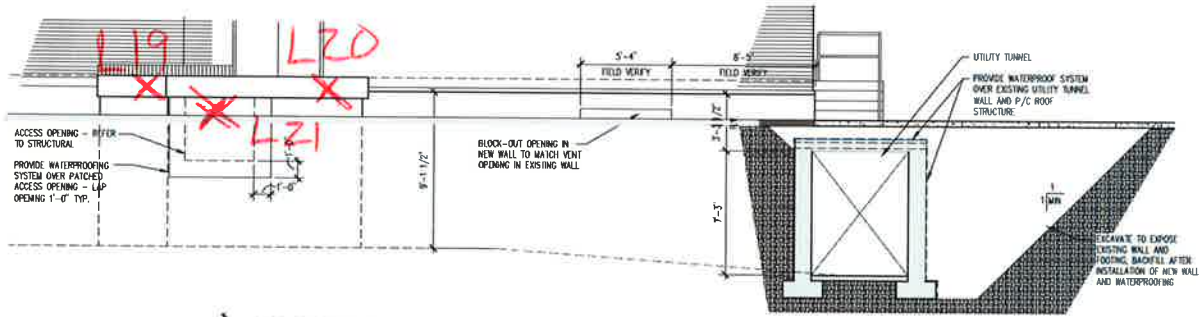




3 PARTIAL SITE SECTION
1/4"=1'-0"

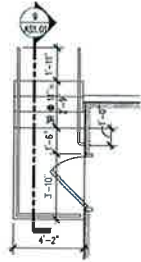


4 PARTIAL SITE SECTION
1/4"=1'-0"

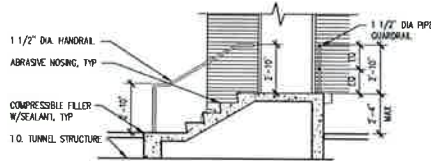


6 PARTIAL SITE SECTION
1/4"=1'-0"

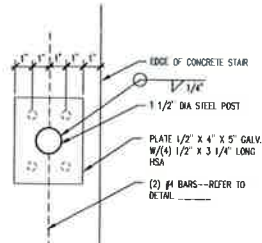
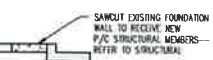
Building 4
LBPSAMPLE LOCATIONS



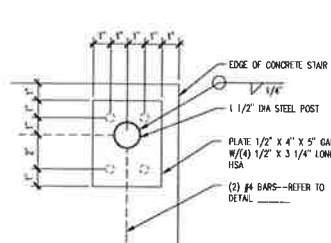
8 STAIR PLAN
1/4"=1'-0"



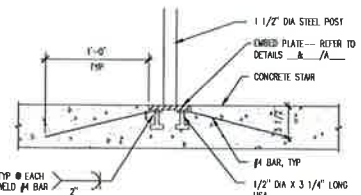
9 STAIR SECTION
1/4"=1'-0"



12 RAIL DETAIL
3"=1'-0"

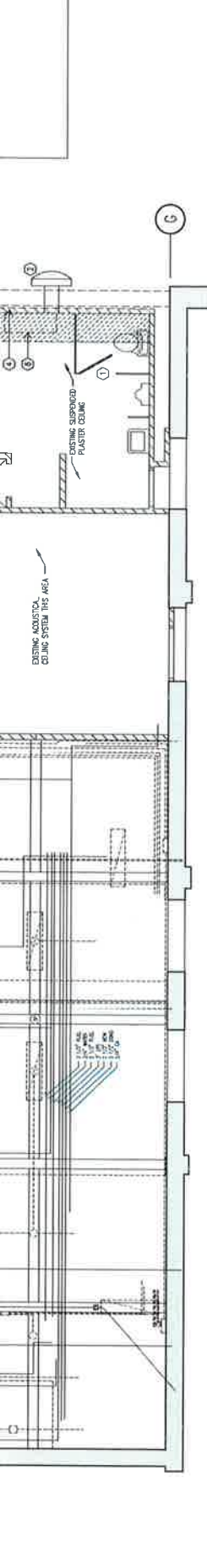


13 RAIL DETAIL
3"=1'-0"

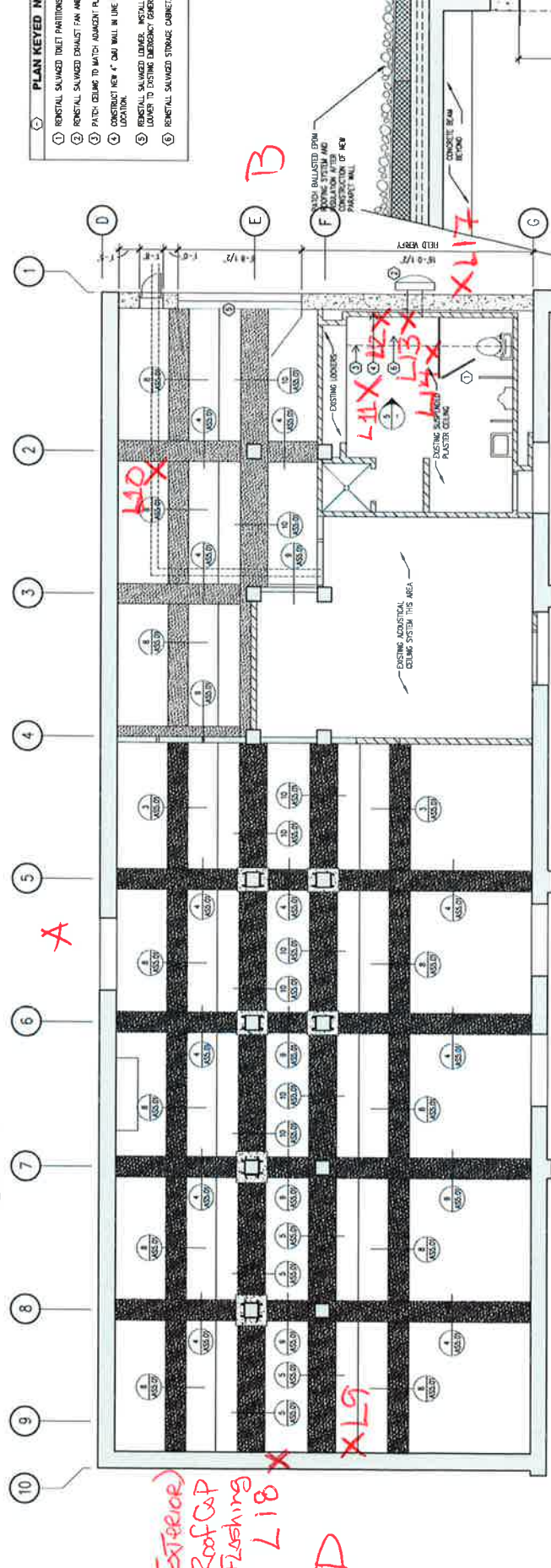


14 RAIL DETAIL
1 1/2"=1'-0"

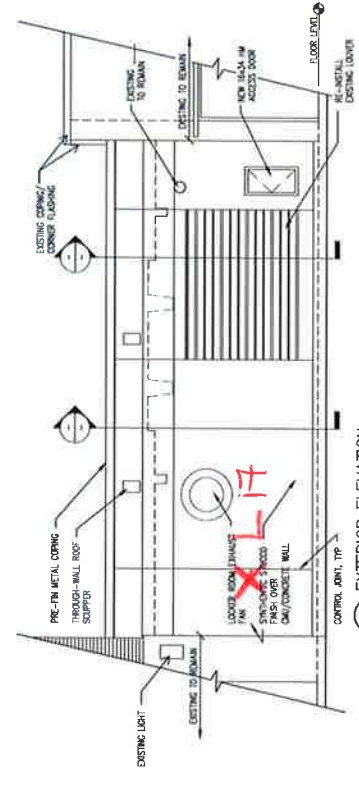
DESIGNED: MARK GUNDEL	CHECKED: WALTER LARSEN	DATE: 11/11/11	PROJECT FILE: BUILDING 4 ARCHITECTURAL PLANS, SECTIONS, DETAILS
DESIGNED: JOHN COOPER	CHECKED: FREDERICK GUNDEL	DATE: 11/11/11	PROJECT FILE: BUILDING 4 ARCHITECTURAL PLANS, SECTIONS, DETAILS
DESIGNED: JAMES KELLY	CHECKED: JAMES KELLY	DATE: 11/11/11	PROJECT FILE: BUILDING 4 ARCHITECTURAL PLANS, SECTIONS, DETAILS
DESIGNED: JAMES KELLY	CHECKED: JAMES KELLY	DATE: 11/11/11	PROJECT FILE: BUILDING 4 ARCHITECTURAL PLANS, SECTIONS, DETAILS



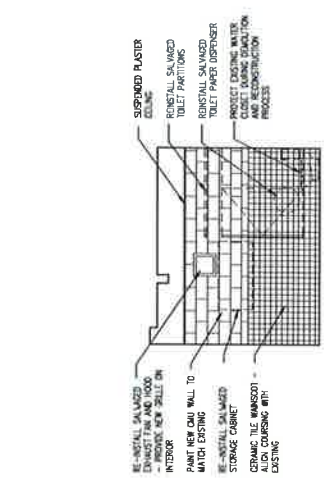
1 DEMOLITION / UTILITY REFERENCE CEILING PLAN
1/4"=1'-0"



3 REMODEL / CEILING PLAN
1/4"=1'-0"



4 EXTERIOR ELEVATION
1/4"=1'-0"



5 LOCKER ROOM ELEVATION
1/4"=1'-0"

6 WALL SECTION
3/4"=1'-0"

- PLAN KEYED TO:
- REINSTALL SALVAGED TOILET PARTITIONS
 - REINSTALL SALVAGED DOWN LIGHTS
 - PATCH CEILING TO MATCH ADJACENT LOCATION
 - CONSTRUCT NEW 4" QUI WALL IN LINE
 - REINSTALL SALVAGED LOWER INSTALL LOWER TO EXISTING EMERGENCY GALLERY
 - REINSTALL SALVAGED STORAGE CABINET

(Exterior)
Roof Cap
Flashing
L18 X
D

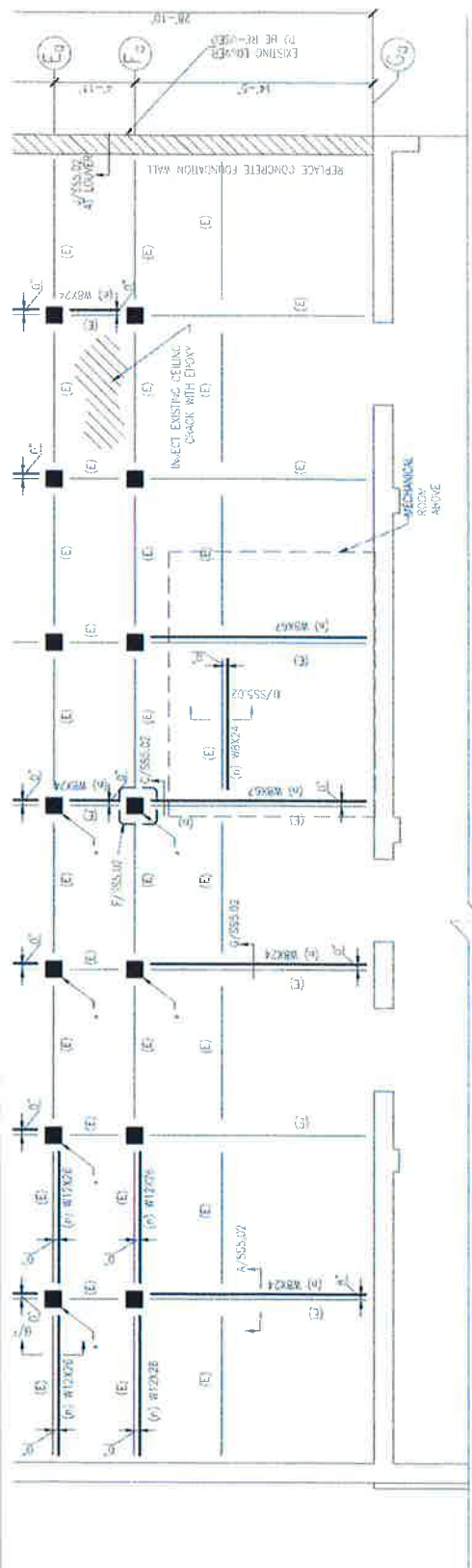
Building 7
LBP Sample Locations

TECHNICAL SERVICES AND CONSULTING
1225 TOWER AVE
SUPERIOR, WI 54880
715-392-1879

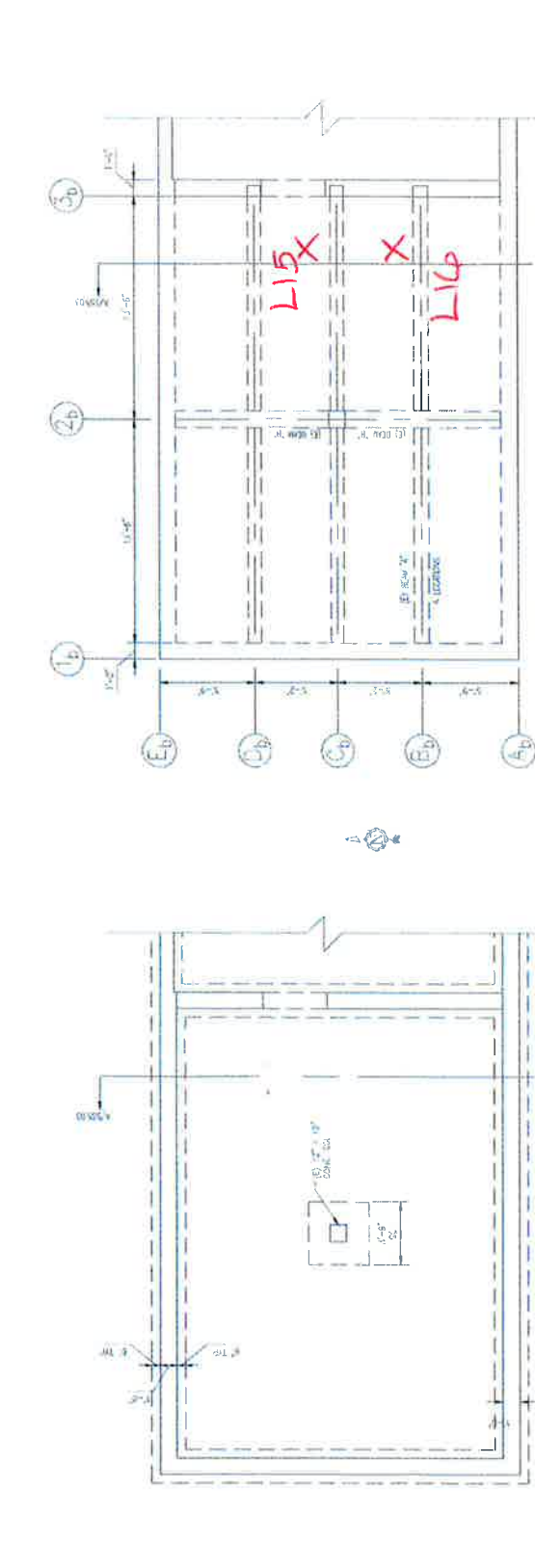
TS&C
Technical Services & Consulting, LLC

PERFORMANCE DESIGN
Landscape Architecture

711 Washington Ave., Ste 200 | Wausau, WI 54981 | (715) 832-0200



PROJECT AREA "A" FRAMING PLAN 1/4" = 1'-0"

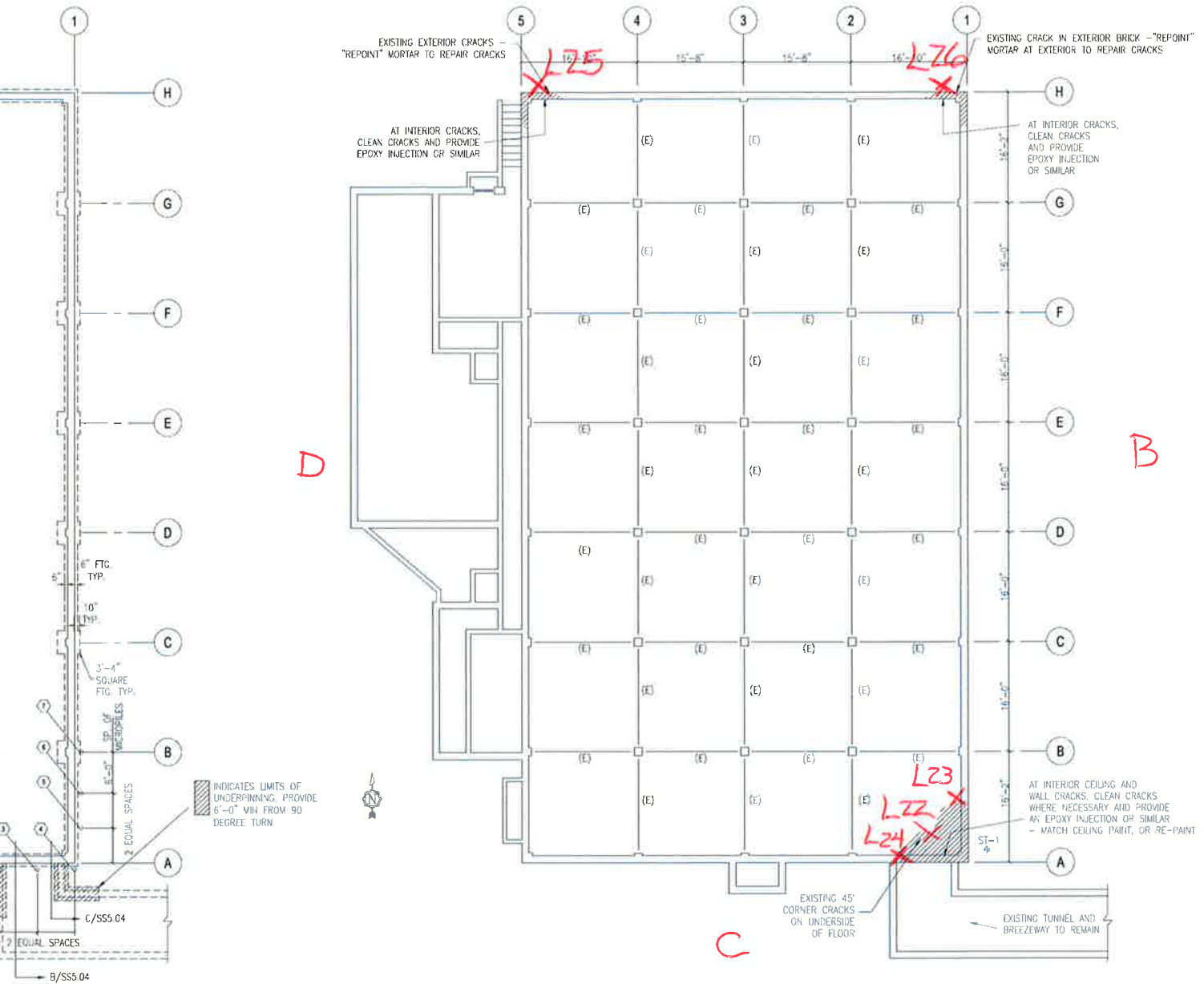


Building 7 - Salt Room

PROJECT AREA "B" FRAMING PLAN 1/4" = 1'-0"

PROJECT AREA "B" FOUNDATION PLAN 1/4" = 1'-0"

LBP SAMPLE LOCATIONS



PLAN 1/8" = 1'-0"

BUILDING 59 FIRST FLOOR FRAMING PLAN 1/8" = 1'-0"

LBP SAMPLE LOCATIONS

NOTES:

1. PROVIDE (7) "MICROPILES" AT APPROXIMATE LOCATIONS AS SHOWN.
2. LOCATIONS OF "MICROPILES" ARE TO BE FIELD VERIFIED (F.V.) ONCE FOUNDATIONS ARE EXPOSED AND ONCE FINAL CONDITIONS ARE KNOWN. ENGINEER OF RECORD TO APPROVE FINAL LAYOUT.
3. ALL "MICROPILES" SHALL BE DESIGNED BY A MINNESOTA REGISTERED ENGINEER EMPLOYED BY THE PIER FABRICATOR/INSTALLER. CALCULATIONS BEARING THE ENGINEER'S STAMP AND SIGNATURE SHALL ACCOMPANY THE SHOP DRAWINGS. PILES SHALL BE DESIGNED AND DENOTED ON THE DRAWINGS AND PER THE SOILS REPORT DATED JUNE 10, 2014 BY BRAUN INTERTEC CORPORATION.
4. FOR STRUCTURAL GENERAL NOTES, SHEET SS1-00
5. ** MICROPILES #2, 3 & 4 MAY NEED TO BE INSTALLED WITHIN THE TUNNEL. CONTRACTOR TO LAYOUT BEST FEASIBLE OPTION PRIOR TO CONSTRUCTION.
6. REFER TO ARCHITECTURAL FOR ELEVATION AND GRADE CHANGES

7
100,598 lbs.
51,045 lbs.
39,610 lbs.
FACTORED



TECHNICAL SERVICES AND CONSULTING
1225 TOWER AVE
SUPERIOR, WI 54880
715-392-1879

NO.	DESCRIPTION	DATE	BY	CHECKED
1	ISSUED FOR PERMIT	06/10/14	J. J. BROWN	
2	ISSUED FOR CONSTRUCTION			
3	ISSUED FOR AS-BUILT			
4	ISSUED FOR RECORD			

SECTION VI

Asbestos and Lead Inspector's Licenses

Asbestos Inspector State Certification/Accreditation



W J Dold
Director, Env. Health Div.



**ASBESTOS
INSPECTOR**

Certified by:

State of Minnesota
Department of Health

Expires: 10/10/2015

William J Dold
1029 Paul Parkway #116
Blaine, MN 55434

No AI2355

Issued: 10/13/2014

Inspector

I have completed an EPA-approved training course and all appropriate refresher courses and am licensed as an Asbestos Inspector by the Minnesota Department of Health.

W J Dold

Signature

October 30, 2014

Date of Inspection

William Dold

Print Name

AI2355

State Certification/Accreditation Number

Lead Risk Assessor Certification/Accreditation



Michael T Voss
Director, Env. Health Div.



LEAD
Risk Assessor

Licensed by:
State of Minnesota
Department of Health
License No. LR514
Expires 12/02/2014

Michael T Voss
7251 Mackenzie Ave NE
Otsego, MN 55330

Inspector

I have completed an approved training course and all appropriate refresher courses and am licensed as a Lead Risk Assessor by the Minnesota Department of Health.

Michael Voss

Signature

November 6, 2014

Date of Inspection

Michael Voss

Print Name

LR514

State Certification/Accreditation Number

SECTION 02 82 13.20
ASBESTOS CLASS II REMOVAL

TABLE OF CONTENTS

PART 1 - GENERAL.....	4
1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS.....	4
1.2 EXTENT OF WORK.....	4
1.3 RELATED WORK.....	4
1.4 TASKS.....	5
1.5 ABATEMENT CONTRACTOR USE OF PREMISES.....	5
1.6 VARIATIONS IN QUANTITY.....	5
1.7 STOP ASBESTOS REMOVAL.....	5
1.8 GENERAL.....	6
1.9 GLOSSARY.....	6
1.10 REFERENCED STANDARDS ORGANIZATIONS.....	13
1.11 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS.....	15
1.12 CONTRACTOR RESPONSIBILITY.....	16
1.13 FEDERAL REQUIREMENTS.....	16
1.14 STATE REQUIREMENTS.....	16
1.15 LOCAL REQUIREMENTS.....	16
1.16 STANDARDS.....	17
1.17 EPA GUIDANCE DOCUMENTS.....	18
1.18 NOTICES.....	18
1.19 PERMITS/LICENSES.....	18
1.20 POSTING AND FILING OF REGULATIONS.....	18
1.21 VA RESPONSIBILITIES.....	19
1.22 SITE SECURITY.....	19
1.23 EMERGENCY ACTION PLAN AND ARRANGEMENTS.....	19
1.24 PRE-CONSTRUCTION MEETING.....	21
1.25 PROJECT COORDINATION.....	21
1.26 PERSONNEL.....	21
1.27 GENERAL - RESPIRATORY PROTECTION PROGRAM.....	23
1.28 RESPIRATORY PROTECTION PROGRAM COORDINATOR.....	23
1.29 SELECTION AND USE OF RESPIRATORS.....	23
1.30 MINIMUM RESPIRATORY PROTECTION.....	23
1.31 MEDICAL WRITTEN OPINION.....	23
1.32 RESPIRATOR FIT TEST.....	23
1.33 RESPIRATOR FIT CHECK.....	24
1.34 MAINTENANCE AND CARE OF RESPIRATORS.....	24
1.35 TRAINING OF ABATEMENT PERSONNEL.....	24

1.36 MEDICAL EXAMINATIONS.....	24
1.37 PERSONAL PROTECTIVE EQUIPMENT.....	24
1.38 REGULATED AREA ENTRY PROCEDURE.....	25
1.39 DECONTAMINATION PROCEDURE.....	25
1.40 REGULATED AREA REQUIREMENTS.....	25
1.41 WASTE/EQUIPMENT DECONTAMINATION AREA (W/EDA).....	25
1.42 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES.....	25
PART 2 - PRODUCTS.....	25
2.1 GENERAL REQUIREMENTS (ALL ABATEMENT PROJECTS).....	25
2.2 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA.....	27
2.3 CONTROLLING ACCESS TO THE REGULATED AREA.....	27
2.4 CRITICAL BARRIERS.....	27
2.5 SECONDARY BARRIERS:.....	27
2.6 EXTENSION OF THE REGULATED AREA.....	27
2.7 FIRESTOPPING.....	27
2.8 MONITORING, INSPECTION AND TESTING.....	28
2.9 SCOPE OF SERVICES OF THE VPIH/CIH CONSULTANT.....	28
2.10 MONITORING, INSPECTION AND TESTING BY CONTRACTOR CPIH.....	29
2.11 STANDARD OPERATING PROCEDURES.....	30
2.12 PRE-START MEETING SUBMITTALS.....	30
2.13 SUBMITTALS DURING ABATEMENT.....	33
2.14 SUBMITTALS AT COMPLETION OF ABATEMENT.....	33
PART 3 - EXECUTION.....	33
3.1 PRE-ABATEMENT MEETING.....	33
3.2 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS.....	34
3.3 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS.....	34
3.4 OSHA DANGER SIGNS.....	35
3.5 SHUT DOWN - LOCK OUT ELECTRICAL.....	35
3.6 SHUT DOWN - LOCK OUT HVAC.....	35
3.7 SANITARY FACILITIES.....	36
3.8 WATER FOR ABATEMENT.....	36
3.9 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA.....	36
3.10 PREPARATION PRIOR TO SEALING OFF.....	36
3.11 CONTROLLING ACCESS TO THE REGULATED AREA.....	36
3.12 CRITICAL BARRIERS.....	36
3.13 EXTENSION OF THE REGULATED AREA.....	36
3.14 REMOVAL OF CLASS II MATERIALS.....	36
3.15 DISPOSAL OF CLASS II WASTE MATERIAL:.....	37
3.16 PROJECT DECONTAMINATION.....	37

3.17 WORK DESCRIPTION..... 37
3.18 PRE-DECONTAMINATION CONDITIONS..... 37
3.19 CLEANING:..... 37
3.20 VISUAL INSPECTION AND AIR CLEARANCE TESTING..... 37
3.21 VISUAL INSPECTION..... 38
3.22 COMPLETION OF ABATEMENT WORK..... 38
3.23 CERTIFICATE OF COMPLETION BY CONTRACTOR..... 38
3.24 WORK SHIFTS..... 38

ATTACHMENT #1 CERTIFICATE OF COMPLETION

ATTACHMENT #2 CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

ATTACHMENT #3 AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND TRAINING/ACCREDITATION

Attachment #4 ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE VA'S ASBESTOS SPECIFICATIONS

SECTION 02 82 13.20

**ASBESTOS CLASS II REMOVAL
SPECIFICATIONS**

PART 1 - GENERAL

1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS

Drawings, general provisions of the contract, including general and supplementary conditions and other Division 01 specifications, shall apply to the work of this section. The contract documents show the work to be done under the contract and related requirements and conditions impacting the project. Related requirements and conditions include applicable codes and regulations, notices and permits, existing site conditions and restrictions on use of the site, requirements for partial owner occupancy during the work, coordination with other work and the phasing of the work. In the event the Asbestos Abatement Contractor (Contractor) discovers a conflict in the contract documents and/or requirements or codes, the conflict must be brought to the immediate attention of the Contracting Officer for resolution. Whenever there is a conflict or overlap in the requirements, the most stringent shall apply. Any actions taken by the Contractor without obtaining guidance from the Contracting Officer shall become the sole risk and responsibility of the Contractor. All cost incurred due to such action are also the responsibility of the Contractor.

1.2 EXTENT OF WORK

- A. Below is a brief description of the estimated quantities of asbestos materials to be abated. These quantities are for informational purposes only and are based on the best information available at the time of the specification preparation. The Contractor shall satisfy himself as the actual quantities to be abated. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents.
- B. Removal, clean-up and disposal of below grade exterior waterproofing which is assumed to be present on the exterior surfaces of the Building 4 tunnel system. The waterproofing material is ASSUMED to contain asbestos.

1.3 RELATED WORK

- A. Section 02 41 00, DEMOLITION.
- B. Section 03 30 00, Cast-in-Place Concrete
- C. Section 03 41 33, Precast Structural Pretension Concrete
- D. Section 07 13 52, Modified Bituminous Sheet Waterproofing

1.4 TASKS

The work tasks are summarized briefly as follows:

- A. Pre-abatement activities including pre-abatement meeting(s), inspection(s), notifications, permits, submittal approvals, work-site preparations, emergency procedures arrangements, and standard operating procedures for Class II asbestos abatement work.
- B. Abatement activities including removal, clean-up and disposal of ACM waste, recordkeeping, security, monitoring, and inspections.
- C. Cleaning and decontamination activities including final visual inspection, and certification of decontamination.

1.5 ABATEMENT CONTRACTOR USE OF PREMISES

- A. The Contractor and Contractor's personnel shall cooperate fully with the VA representative/consultant to facilitate efficient use of buildings and areas within buildings. The Contractor shall perform the work in accordance with the VA specifications, drawings, phasing plan and in compliance with any/all applicable Federal, State and Local regulations and requirements.
- B. The Contractor shall use the existing facilities in the building strictly within the limits indicated in contract documents as well as the approved pre-abatement work plan. Any variation from the arrangements shown on drawings shall be secured in writing from the VA representative through the pre-abatement plan of action.

1.6 VARIATIONS IN QUANTITY

The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimates which are limited by the physical constraints imposed by occupancy of the buildings. Accordingly, minor variations (+/- 5%) in quantities of ACM within the regulated area are considered as having no impact on contract price and time requirements of this contract. Where additional work is required beyond the above variation, the Contractor shall provide unit prices for additional work that is newly discovered materials and those prices will be used for additional work under the contract.

1.7 STOP ASBESTOS REMOVAL

If the Contracting Officer or their field representative presents a written **Stop Asbestos Removal Order**, the Contractor/Personnel shall immediately stop all asbestos removal and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until authorized to do so by the VA. A stop asbestos removal order may be issued at any time the VA determines abatement conditions/ activities are not within specification requirements. Work stoppage will continue

until conditions have been corrected to the satisfaction of the VA. Standby time and costs for corrective actions will be borne by the Contractor, including the VPIH/CIH time. The occurrence of any of the following events shall be reported immediately by the Contractor in writing to the VA representative and shall require the Contractor to immediately stop asbestos removal activities and initiate corrective activities:

- A. serious injury/death at the site;
- B. fire/safety emergency at the site;
- C. respiratory protection system failure;
- D. power failure loss of wetting agent; or
- E. any visible emissions observed outside the regulated area.

1.8 GENERAL

Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

1.9 GLOSSARY

Abatement - Procedures to control fiber release from asbestos-containing materials, typically during removal. Includes removal, encapsulation, enclosure, demolition and renovation activities related to asbestos.

ACE - Asbestos contaminated elements.

ACM - Asbestos containing material.

Aerosol - Solid or liquid particulate suspended in air.

Adequately wet - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

Aggressive method - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

Aggressive sampling - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.

AHERA - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.

Aircell - Pipe or duct insulation made of corrugated cardboard which contains asbestos.

Air monitoring - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 2 is used to determine the fiber levels in air.

Air sample filter - The filter used to collect fibers which are then counted. The filter is made of mixed cellulose ester membrane for PCM (Phase Contrast Microscopy) and polycarbonate for TEM (Transmission Electron Microscopy)

Amended water - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.

Asbestos - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.

Asbestos-containing material (ACM) - Any material containing more than one percent asbestos.

Asbestos contaminated elements (ACE) - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.

Asbestos-containing waste material - Asbestos-containing material or asbestos contaminated objects requiring disposal.

Asbestos waste decontamination facility - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

Authorized person - Any person authorized by the VA, the Contractor, or government agency and required by work duties to be present in regulated areas.

Authorized visitor - Any person approved by the VA; the contractor; or any government agency having jurisdiction over the regulated area.

Barrier - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

Containment Barrier - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting which surrounds and seals the outer perimeter of the regulated area.

Critical Barrier - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of plastic sheeting secured in place at openings such as doors, windows, or any other opening into the regulated area.

Primary Barrier - Barriers placed over critical barriers and exposed directly to abatement work.

Secondary Barrier - Any additional sheeting used to isolate and provide protection from debris during abatement work.

Breathing zone - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

Bridging encapsulant - An encapsulant that forms a layer on the surface of the ACM.

Building/facility owner - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

Bulk testing - The collection and analysis of suspect asbestos containing materials.

Certified Industrial Hygienist (CIH) - One certified in practice of industrial hygiene by the American Board of Industrial Hygiene. An industrial hygienist Certified in Comprehensive Practice by the American Board of Industrial Hygiene.

Class I asbestos work - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

Class II asbestos work - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

Clean room/Changing room - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

Clearance sample - The final air sample taken after all asbestos work has been done and visually inspected.

Performed by the VA's industrial hygiene consultant (VPIH).

Closely resemble - The major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person - In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

Contractor's Professional Industrial Hygienist (CPIH) - The Contractor's industrial hygienist. The industrial hygienist must meet the qualification requirements of the PIH.

Count - Refers to the fiber count or the average number of fibers greater than five microns in length per cubic centimeter of air.

Decontamination area/unit - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Disposal bag - Typically 6 mil thick siftproof, dustproof, leaktight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.

Disturbance - Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or disposal bag which shall not exceed 60 inches in length or width.

Drum - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be siftproof, dustproof, and leaktight.

Employee exposure - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

Encapsulant - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.

Encapsulation - Treating ACM with an encapsulant.

Enclosure - The construction of an air tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.

Equipment room - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber - A particulate form of asbestos, 5 microns or longer, with a length to width ratio of at least 3 to 1.

Fibers per cubic centimeter (f/cc) - Abbreviation for fibers per cubic centimeter, used to describe the level of asbestos fibers in air.

Filter - Media used in respirators, vacuums, or other machines to remove particulate from air.

Firestopping - Material used to close the open parts of a structure in order to prevent a fire from spreading.

Friable asbestos containing material - Any material containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR 763, Section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Glovebag - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

High efficiency particulate air (HEPA) filter - A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 microns or greater in diameter.

HEPA vacuum - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.

Homogeneous area - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.

HVAC - Heating, Ventilation and Air Conditioning

Industrial hygienist - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).

Industrial hygienist technician - A person working under the direction of an IH or CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned.

Intact - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Lockdown - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.

National Emission Standards for Hazardous Air Pollutants (NESHAP's) - EPA's rule to control emissions of asbestos to the environment.

Negative initial exposure assessment - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f) (2) (iii), that

employee exposure during an operation is expected to be consistently below the PEL's.

Negative pressure - Air pressure which is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02" water gauge inside the negative pressure enclosure.

Negative pressure respirator - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air outside the respirator.

Non-friable ACM - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Organic vapor cartridge - The type of cartridge used on air purifying respirators for organic vapor exposures.

Outside air - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open ferry dock.

Owner/operator - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Penetrating encapsulant - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.

Personal sampling/monitoring - Representative air samples obtained in the breathing zone of the person using a cassette and battery operated pump to determine asbestos exposure.

Permissible exposure limit (PEL) - The level of exposure OSHA allows for an 8 hour time weighted average. For asbestos fibers, the PEL is 0.1 fibers per cc.

Polarized light microscopy (PLM) - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type(s) of asbestos present in a bulk sample.

Polyethylene sheeting - Strong plastic barrier material 4 to 6 mils thick, semi-transparent, sometimes flame retardant in compliance with NFPA 241.

Positive/negative fit check - A method of verifying the fit of a respirator by closing off the filters and breathing in or closing off the exhalation valve and breathing out while detecting leakage of the respirator.

Presumed ACM (PACM) - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building owner has actual knowledge, or should have known through the exercise of due

diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (k) (5).

Professional IH - An IH who meets the definition requirements of AIHA; meets the definition requirements of OSHA as a "Competent Person" at 29 CFR 1926.1101 (b); has completed two specialized EPA approved courses on management and supervision of asbestos abatement projects; has formal training in respiratory protection and waste disposal; and has a minimum of four projects of similar complexity with this project of which at least three projects serving as the supervisory IH.

Project designer - A person who has successfully completed the training requirements for an asbestos abatement project designer as required by 40 CFR 763 Appendix C, Part I; (B) (5).

Protection factor - A value assigned by OSHA/NIOSH to indicate the assigned protection a respirator should provide if worn properly. The number indicates the reduction of exposure level from outside to inside the respirator.

Qualitative fit test (QLFT) - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

Quantitative fit test (QNFT) - A fit test using a challenge material which is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.

Regulated area - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.

Regulated ACM (RACM) - Friable ACM; Category I nonfriable ACM that has become friable; Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.

Removal - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.

Renovation - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component which does not involve demolition activity.

Repair - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Shower room - The portion of the PDF where personnel shower before leaving the regulated area. Also used for bag/drum decontamination in the EDF.

Standard operating procedures (SOP's) - Asbestos work procedures required to be submitted by the contractor before work begins.

Supplied air respirator (SAR) - A respirator that utilizes an air supply separate from the air in the regulated area.

Surfacing ACM - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, fireproofing and other purposes.

Surfactant - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.

Thermal system ACM - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

Transmission electron microscopy (TEM) - A microscopy method that can identify and count asbestos fibers.

VA Industrial Hygienist (VPIH/CIH) - Department of Veterans Affairs Professional Industrial Hygienist.

VA Representative - The VA official responsible for on-going project work.

Visible emissions - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM or ACM waste material.

Waste/Equipment decontamination area (W/EDA) - The area in which waste is packaged and equipment is decontaminated before removal from the regulated area.

Waste generator - Any owner or operator whose act or process produces asbestos-containing waste material.

Waste shipment record - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

Wet cleaning - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

1.10 REFERENCED STANDARDS ORGANIZATIONS

The following acronyms or abbreviations as referenced in contract/specification documents are defined to mean the associated names. Names and addresses may be subject to change.

- A. VA Department of Veterans Affairs
810 Vermont Avenue, NW
Washington, DC 20420
- B. AIHA American Industrial Hygiene Association
2700 Prosperity Avenue, Suite 250
Fairfax, VA 22031
703-849-8888
- C. ANSI American National Standards Institute
1430 Broadway
New York, NY 10018
212-354-3300
- D. ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103
215-299-5400
- E. CFR Code of Federal Regulations
Government Printing Office
Washington, DC 20420
- F. CGA Compressed Gas Association
1235 Jefferson Davis Highway
Arlington, VA 22202
703-979-0900
- G. CS Commercial Standard of the National Institute of Standards and
Technology (NIST)
U. S. Department of Commerce
Government Printing Office
Washington, DC 20420
- H. EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460
202-382-3949
- I. MIL-STD Military Standards/Standardization Division
Office of the Assistant Secretary of Defense
Washington, DC 20420
- J. MSHA Mine Safety and Health Administration
Respiratory Protection Division
Ballston Tower #3
Department of Labor
Arlington, VA 22203
703-235-1452

- K. NIST National Institute for Standards and Technology
U. S. Department of Commerce
Gaithersburg, MD 20234
301-921-1000
- L. NEC National Electrical Code (by NFPA)
- M. NEMA National Electrical Manufacturer's Association
2101 L Street, NW
Washington, DC 20037
- N. NFPA National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
800-344-3555
- O. NIOSH National Institutes for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226
513-533-8236
- P. OSHA Occupational Safety and Health Administration
U.S. Department of Labor
Government Printing Office
Washington, DC 20402
- Q. UL Underwriters Laboratory
333 Pfingsten Rd.
Northbrook, IL 60062
312-272-8800
- R. USA United States Army
Army Chemical Corps
Department of Defense
Washington, DC 20420

1.11 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS

- A. All work under this contract shall be done in strict accordance with all applicable Federal, State, and local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.
- B. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirement(s) shall be utilized.

- C. Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 shall be available at the worksite in the clean change area of the worker decontamination system.

1.12 CONTRACTOR RESPONSIBILITY

The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the abatement project. The Contractor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment as required by applicable Federal, State and Local regulations. The contractor shall hold the VA and VPIH/CIH consultants harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The contractor will incur all costs of the CPIH, including all sampling/analytical costs to assure compliance with OSHA/EPA/State requirements.

1.13 FEDERAL REQUIREMENTS

Federal requirements which govern some aspect of asbestos abatement include, but are not limited to, the following regulations.

- A. Occupational Safety and Health Administration (OSHA)
 - 1. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
 - 2. Title 29 CFR 1910.132 - Personal Protective Equipment
 - 3. Title 29 CFR 1910.134 - Respiratory Protection
 - 4. Title 29 CFR 1926 - Construction Industry Standards
 - 5. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
 - 6. Title 29 CFR 1910.1200 - Hazard Communication
 - 7. Title 29 CFR 1910.151 - Medical and First Aid
- B. Environmental Protection Agency (EPA)
 - 1. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.
 - 2. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)
- C. Department of Transportation (DOT)
 - Title 49 CFR 100 - 185 - Transportation

1.14 STATE REQUIREMENTS

State requirements that apply to the asbestos abatement work, disposal, clearance, etc., include, but are not limited to, the following:
Minnesota Pollution Control Agency (MPCA):

1. The MPCA has been delegated the authority by the EPA to enforce NESHAP regulations. They may also review projects for compliance with MDH Asbestos Abatement Rules.
2. Guidance Regarding Proper Containment, Shipping and Final Disposal of Asbestos Residual Materials at MPCA-Permitted Landfills (*Minnesota Rules 7035.1700*)

Minnesota Department of Labor and Industry:

1. Maintenance and Repair of Buildings and Equipment—Asbestos (*Minnesota Rules 5205.0660*)
2. Demolition, Restoration, Remodeling Survey (*Minnesota Rules 5207.0035*)

Minnesota Department of Health:

1. Asbestos Abatement Rules (*Minnesota Rules 4620.3000 to 4620.3724 and Minnesota Statute Sections 326.70 to 326.81*)

1.15 LOCAL REQUIREMENTS

If local requirements are more stringent than federal or state standards, the local standards are to be followed.

1.16 STANDARDS

- A. Standards which govern asbestos abatement activities include, but are not limited to, the following:
 1. American National Standards Institute (ANSI) Z9.2-79 - Fundamentals Governing the Design and Operation of Local Exhaust Systems Z88.2 - Practices for Respiratory Protection.
 2. Underwriters Laboratories (UL) 586-90 - UL Standard for Safety of HEPA filter Units, 7th Edition.
- B. Standards which govern encapsulation work include, but are not limited to, the following:
 1. American Society for Testing and Materials (ASTM)
- C. Standards which govern the fire and safety concerns in abatement work include, but are not limited to, the following:
 1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 2. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.
 3. NFPA 101 - Life Safety Code

1.17 EPA GUIDANCE DOCUMENTS

- A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.
- B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024
- C. Asbestos Waste Management Guidance EPA 530-SW-85-007
- D. A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001
- E. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990

1.18 NOTICES

- A. State and Local agencies: Send written notification as required by state and local regulations prior to beginning any work on ACM.
- B. Copies of notifications shall be submitted to the VA for the facility's records in the same time frame notification is given to EPA, State, and Local authorities.

Postmark or Deliver Written Notification as required by USEPA National Emission Standards for Hazardous Air Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M) at least 10 working days prior to beginning any work on asbestos-containing materials (ACM).: Send notification to:

MN Asbestos Coordinator
MPCA, Metro Districts
Regular Facilities Section
520 Lafayette Road
St. Paul, MN 55155-4194

1.19 PERMITS

- A. The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations.

At least five (5) calendar days prior to commencement of work, submit "Notification of Intent to Perform an Asbestos Abatement Project" with a copy of a signed contract or other written evidence of the total cost of the abatement project and a check in the amount of one per cent of the total cost of the abatement project, made payable to "Minnesota Department of Health", to:

Minnesota Department of Health
Division of Environmental Health
Asbestos/Lead Compliance Unit
P.O. Box 64497
St. Paul, MN 55164-0497
651-201-4610/4620

1.20 POSTING AND FILING OF REGULATIONS

- A. Maintain two (2) copies of applicable federal, state, and local regulations. Post one copy of each at the regulated area where workers

will have daily access to the regulations and keep another copy in the Contractor's office.

1.21 VA RESPONSIBILITIES

Prior to commencement of work:

- A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment and personal possessions to avoid unauthorized access into the regulated area. **Note: Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.**

1.22 SITE SECURITY

- A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Contractor's employees, employees of Subcontractors, VA employees and representatives, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the staging area.
- B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry. The Competent person shall immediately notify the VA.
- C. A log book shall be maintained in the staging area. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through the staging area. The only exceptions for this requirement are the waste/equipment load-out area which shall be isolated except during the removal of containerized asbestos waste from the regulated area.
- E. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel.
- F. The Contractor will have the VA's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the VA's employees.

1.23 EMERGENCY ACTION PLAN AND ARRANGEMENTS

- A. An Emergency Action Plan shall be developed by the Contractor prior to commencing abatement activities and shall be agreed to by the Contractor and the VA. The Plan shall meet the requirements of 29 CFR 1910.38 (a); (b).

- B. Emergency procedures shall be in written form and prominently posted and available in the regulated area. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule and layout of regulated area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.
 - 1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.
 - 2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.
- F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.
- G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.
- H. The Emergency Action Plan shall provide for a Contingency Plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; and power failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

1.24 PRE-CONSTRUCTION MEETING

Prior to commencing the work, the Contractor shall meet with the VPCIH to present and review, as appropriate, the items following this paragraph. The Contractor's Competent Person(s) who will be on-site shall participate in the pre-start meeting. The pre-start meeting is to discuss and determine procedures to be used during the project. At this meeting, the Contractor shall provide:

- A. Proof of Contractor licensing.
- B. Proof the Competent Person is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person shall also be presented.
- C. A list of all workers who will participate in the project, including experience and verification of training and accreditation.
- D. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.
- E. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).
- F. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.
- G. A copy of the Contractor's Standard Operating Procedures for Class I Glovebag Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project.
 1. Regulated area preparation procedures;
 2. Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d);
 3. and Decontamination procedures for employees;
 4. Class II abatement methods/procedures and equipment to be used;
 5. Personal protective equipment to be used;
- H. The Contractor shall provide all State and Local notices and permits.
- I. Procedures for handling, packaging and disposal of asbestos waste.
- J. Emergency Action Plan and Contingency Plan procedures.

1.25 PROJECT COORDINATION

The following are the minimum administrative and supervisory personnel necessary for coordination of the work.

1.26 PERSONNEL

- A. Administrative and supervisory personnel shall consist of a qualified Competent Person as defined by OSHA in the Construction Standards and the Asbestos Construction Standard; Contractor Professional Industrial Hygienist and Industrial Hygiene Technicians. These employees are the

Contractor's representatives responsible for compliance with these specifications and all other applicable requirements.

- B. Non-supervisory personnel shall consist of an adequate number of qualified personnel to meet the schedule requirements of the project. Personnel shall meet required qualifications. Personnel utilized on-site shall be pre-approved by the VA representative. A request for approval shall be submitted for any person to be employed during the project giving the person's name; social security number; qualifications; accreditation card with picture; Certificate of Worker's Acknowledgment; and Affidavit of Medical Surveillance and Respiratory Protection and current Respirator Fit Test.
- C. Minimum qualifications for Contractor and assigned personnel are:
1. The Contractor has conducted within the last three (3) years, three (3) projects of similar complexity and dollar value as this project; has not been cited and penalized for serious violations of asbestos regulations in the past three (3) years; has adequate liability/occurrence insurance for asbestos work; is licensed in applicable states; has adequate and qualified personnel available to complete the work; has comprehensive standard operating procedures for asbestos work; has adequate materials, equipment and supplies to perform the work.
 2. The Competent Person has four (4) years of abatement experience of which two (2) years were as the Competent Person on the project; meets the OSHA definition of a Competent Person; has been the Competent Person on two (2) projects of similar size and complexity as this project; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers; and has all required OSHA documentation related to medical and respiratory protection.
 3. The Contractor Professional Industrial Hygienist (CPIH) shall have five (5) years of monitoring experience and supervision of asbestos abatement projects; has participated as senior IH on five (5) abatement projects, three (3) of which are similar in size and complexity as this project; has developed at least one complete standard operating procedure for asbestos abatement; has trained abatement personnel for three (3) years; has specialized EPA AHERA/OSHA training in asbestos abatement management, respiratory protection, waste disposal and asbestos inspection; has completed the NIOSH 582 Course, Contractor/Supervisor course; and has appropriate medical/respiratory protection records/documentation.
 4. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker course; have training on the standard operating

procedures of the Contractor; has one year of asbestos abatement experience; has applicable medical and respiratory protection documentation; has certificate of training/current refresher and State accreditation/license.

1.27 GENERAL - RESPIRATORY PROTECTION PROGRAM

The Contractor shall develop and implement a Respiratory Protection Program (RPP) which is in compliance with the January 8, 1998 OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910.132;134. ANSI Standard Z88.2-1992 provides excellent guidance for developing a respiratory protection program. All respirators used must be NIOSH approved for asbestos abatement activities. The written respiratory protection shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c) (1) (i - ix) - Respiratory Protection Program.

1.28 RESPIRATORY PROTECTION PROGRAM COORDINATOR

The Respiratory Protection Program Coordinator (RPPC) must be identified and shall have two (2) years experience coordinating the program. The RPPC must provide a signed statement attesting to the fact that the program meets the above requirements.

1.29 SELECTION AND USE OF RESPIRATORS

The procedure for the selection and use of respirators must be submitted to the VA as part of the Contractor's qualification. The procedure must be written clearly enough for workers to understand. A copy of the Respiratory Protection Program must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

1.30 MINIMUM RESPIRATORY PROTECTION

Minimum respiratory protection shall be a half face, HEPA filtered, air purifying respirator when fiber levels are maintained consistently at or below 0.1 f/cc. A higher level of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

1.31 MEDICAL WRITTEN OPINION

No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a current written opinion for that person.

1.32 RESPIRATOR FIT TEST

All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with

29 CFR 1910.134 (f) and Appendix A. Fit tests shall be done for PAPR's which have been put into a failure mode.

1.33 RESPIRATOR FIT CHECK

The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Headcoverings must cover respirator headstraps. Any situation that prevents an effective facepiece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.

1.34 MAINTENANCE AND CARE OF RESPIRATORS

The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) Maintenance and care of respirators.

1.35 TRAINING OF ABATEMENT PERSONNEL

Prior to beginning any abatement activity, all personnel shall be trained in accordance with OSHA 29 CFR 1926.1101 (k) (9) and any additional State/Local requirements. Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k) (9) (viii). Training shall have been conducted by a third party, EPA/State approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Initial training certificates and current refresher and accreditation proof must be submitted for each person working at the site.

1.36 MEDICAL EXAMINATIONS

Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m) (4) shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

1.37 PERSONAL PROTECTIVE EQUIPMENT

Provide whole body clothing, head coverings, foot coverings and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

1.38 REGULATED AREA ENTRY PROCEDURE

The Competent Person shall ensure that each time workers enter the regulated area, they put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the staging area where they put on non-disposable required personal protective equipment.

1.39 DECONTAMINATION PROCEDURE

The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

- A. When exiting the regulated area, remove all disposable PPE and dispose of in a disposal bag provided in the staging area.
- B. Carefully decontaminate and clean the respirator. Put in a clean container/bag.

1.40 REGULATED AREA REQUIREMENTS

The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for Class II regulated areas at 29 CFR 1926.1101 (e) are met applicable to Class II work. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

1.41 WASTE/EQUIPMENT DECONTAMINATION AREA (W/EDA):

The Competent Person shall provide a W/EDA for removal of all waste, equipment and contaminated material from the regulated area.

1.42 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES:

Contain all waste in 6 mil poly bags. Clean/decontaminate bags and place into another bag or fiber drum. Remove to disposal dumpster/gondola/vehicle. At no time shall unprotected personnel from the clean side be allowed to enter the regulated area.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS (ALL ABATEMENT PROJECTS)

Prior to the start of work, the Contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site and the CPIH has submitted verification to the VA's representative to this effect:

- A. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or

contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.

- C. The Contractor shall not block or hinder use of buildings by patients, staff, and visitors to the VA in partially occupied buildings by placing materials/equipment in any unauthorized place.
- D. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- E. Poly sheeting for critical barriers/floors in the regulated area shall be 6 mil.
- F. If required, the method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the VA and selected to minimize damage to equipment and surfaces.
- G. An adequate number of infra-red heating units, HEPA vacuums, scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements shall be provided. Fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project shall also be provided. All electrically operated hand tools, equipment, electric cords shall be equipped with GFCI protection.
- H. Special protection for objects in the regulated area shall be detailed. (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds, water, and falling material.)
- I. Impermeable fiberboard drums and disposal bags 2 layers of 6 mil, for asbestos waste shall be pre-printed with labels, markings and address as required by OSHA, EPA and DOT regulations.
- J. The VA shall be provided a copy of the MSDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication. Chlorinated compounds shall not be used with any spray adhesive or other product. Appropriate encapsulant(s) shall be provided.
- K. OSHA DANGER demarcation signs, as many and as required by OSHA 29 CFR 1926.1101(k) (7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Staging Area.
- L. Adequate and appropriate PPE for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

2.2 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA

- A. Using warning tape, cordon off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. The dirt floor in the regulated area must be covered with 2 layers of 6 mil poly to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government

2.3 CONTROLLING ACCESS TO THE REGULATED AREA

Access to the regulated area is allowed only through the staging area. All other means of access shall be eliminated and OSHA DANGER demarcation signs posted as required by OSHA

2.4 CRITICAL BARRIERS

Completely separate any openings from the regulated area into adjacent interior areas using two layers of poly at least 6 mils thick and duct tape

2.5 SECONDARY BARRIERS:

A loose layer of 6 mil fire retardant poly shall be used as a drop cloth to protect the floor/horizontal surfaces from debris generated during the Class II work. This layer shall be replaced as needed during the work.

2.6 EXTENSION OF THE REGULATED AREA

If the enclosure of the regulated area is breached in any way that could allow contamination to occur, the affected area shall be included in the regulated area and constructed as per this section. If the affected area cannot be added to the regulated area, decontamination measures must be started immediately.

2.7 FIRESTOPPING:

- A. Through penetrations caused by cables, cable trays, pipes, sleeves must be firestopped with a fire-rated firestop system providing an air tight seal.
- B. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the VA Representative. The Contractor shall list all areas of penetration, the type of sealant used, and whether or not the location is fire rated. Any discovery of penetrations during abatement shall be brought to the attention of the VA Representative immediately. All walls, floors and ceilings are considered fire rated unless otherwise determined by the VA Representative or Fire Marshall.
- C. Any visible openings whether or not caused by a penetration shall be reported by the Contractor to the VA Representative for a sealant system

determination. Firestops shall meet ASTM E814 and UL 1479 requirements for the opening size, penetrant, and fire rating needed.

2.8 MONITORING, INSPECTION AND TESTING

- A. Perform throughout abatement work monitoring, inspection and testing inside and around the regulated area in accordance with the OSHA requirements and these specifications. The CPIH shall periodically inspect and oversee the performance of the Contractor IH Technician. The IH Technician shall continuously inspect and monitor conditions inside the regulated area to ensure compliance with these specifications. In addition, the CPIH shall personally manage air sample collection, analysis, and evaluation for personnel, regulated area, and adjacent area samples to satisfy OSHA requirements. Additional inspection and testing requirements are also indicated in other parts of this specification.
- B. The VA will employ an independent industrial hygienist (VPIH/CIH) consultant and/or use its own IH to perform various services on behalf of the VA. The VPIH/CIH will perform the necessary monitoring, inspection, testing, and other support services to ensure that VA patients, employees, and visitors will not be adversely affected by the abatement work, and that the abatement work proceeds in accordance with these specifications, that the abated areas or abated buildings have been successfully decontaminated. The work of the VPIH/CIH consultant in no way relieves the Contractor from their responsibility to perform the work in accordance with contract/specification requirements, to perform continuous inspection, monitoring and testing for the safety of their employees, and to perform other such services as specified. The cost of the VPIH/CIH and their services will be borne by the VA except for any repeat of final inspection and testing that may be required due to unsatisfactory initial results. Any repeated final inspections and/or testing, if required, will be paid for by the Contractor.

2.9 SCOPE OF SERVICES OF THE VPIH/CIH CONSULTANT

- A. The purpose of the work of the VPIH/CIH is to: assure quality; resolve problems; and prevent the spread of contamination beyond the regulated area. In addition, their work includes performing the final inspection to determine whether the regulated area has been adequately decontaminated. The VPIH/CIH will perform the following tasks:
 - 1. Task 1: Perform unannounced visits to spot check overall compliance of work with contract/specifications. These visits may include any inspection, monitoring, and testing inside and outside the regulated area and all aspects of the operation except personnel monitoring.

2. Task 2: Provide support to the VA representative such as evaluation of submittals from the Contractor, resolution of unforeseen developments, etc.
 3. Task 3: Perform, in the presence of the VA representative, final inspection of a decontaminated regulated area or building at the conclusion of the abatement and clean-up work to certify compliance with all regulations and the VA requirements/specifications.
 4. Task 4: Issue certificate of decontamination for each regulated area or building and project report.
- B. All documentation, inspection results and testing results generated by the VPIH/CIH will be available to the Contractor for information and consideration. The Contractor shall cooperate with and support the VPIH/CIH for efficient and smooth performance of their work.
- C. The monitoring and inspection results of the VPIH/CIH will be used by the VA to issue any Stop Removal orders to the Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.

2.10 MONITORING, INSPECTION AND TESTING BY CONTRACTOR CPIH

The CPIH is responsible for managing all monitoring, inspections, and testing required by these specifications, as well as any and all regulatory requirements adopted by these specifications. The CPIH is responsible for the continuous monitoring of all subsystems and procedures which could affect the health and safety of the Contractor's personnel. Safety and health conditions and the provision of those conditions inside the regulated area for all persons entering the regulated area is the exclusive responsibility of the Contractor /Competent Person. The person performing the personnel and area air monitoring inside the regulated area shall be an IH Technician, who shall be trained and shall have specialized field experience in air sampling and analysis. The IH Technician shall have a NIOSH 582 Course or equivalent and show proof. The IH Technician shall participate in the AIHA Asbestos Analysis Registry or participate in the Proficiency Analytic Testing program of AIHA for fiber counting quality control assurance. The IH Technician shall also be an accredited EPA/State Contractor/Supervisor and Building Inspector. The IH Technician shall have participated in five abatement projects collecting personal and area samples as well as responsibility for documentation. The analytic laboratory used by the Abatement Contractor to analyze the samples shall be AIHA accredited for asbestos PAT. A daily log documenting all OSHA requirements for air monitoring for asbestos in 29 CFR 1926.1101(f), (g) and Appendix A. This log shall be made available to the VA

representative and the VPIH/CIH. The log will contain, at a minimum, information on personnel or area sampled, other persons represented by the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The CPIH shall collect and analyze samples for each representative job being done in the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples per shift shall be collected. In addition to the continuous monitoring required, the CPIH will perform inspection at the final stages of abatement for each regulated area as specified in the CPIH responsibilities.

2.11 STANDARD OPERATING PROCEDURES

The Contractor shall have established Standard Operating Procedures (SOP's) in printed form and loose leaf folder consisting of simplified text, diagrams, sketches, and pictures that establish and explain clearly the ways and procedures to be followed during all phases of the work by the contractor's personnel. The SOP's must be modified as needed to address specific requirements of the project. The SOP's shall be submitted for review and approval prior to the start of any abatement work. The minimum topics and areas to be covered by the SOP's are:

- A. Minimum Personnel Qualifications
- B. Contingency Plans and Arrangements
- C. Security and Safety Procedures
- D. Respiratory Protection/Personal Protective Equipment Program and Training
- E. Medical Surveillance Program and Recordkeeping
- F. Regulated Area Requirements for Class II work
- G. Decontamination Facilities and Entry/Exit Procedures (PDF and W/EDF)
- H. Monitoring, Inspections, and Testing
- I. Removal Procedures for Class II Materials
- J. Disposal of ACM Waste
- K. Regulated Area Decontamination/Clean-up
- L. Regulated Area Visual Clearance
- M. Project Completion/Closeout

2.12 PRE-START MEETING SUBMITTALS

Submit to the VA a minimum of 14 days prior to the pre-start meeting the following for review and approval. Meeting this requirement is a prerequisite for the pre-start meeting for this project.

- A. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.

- B. Submit a staff organization chart showing all personnel who will be working on the project and their capacity/function. Provide their qualifications, training, accreditations, and licenses, as appropriate. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.
- C. Submit Standard Operating Procedures developed specifically for this project, incorporating the requirements of the specifications, prepared, signed and dated by the CPIH.
- D. Submit the specifics of the materials and equipment to be used for this project with brand names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
 - 1. HEPA vacuums, air monitoring pumps, calibration devices, infrared heating machines, and emergency power generating system.
 - 2. Encapsulants, surfactants, hand held sprayers, airless sprayers, fire extinguishers.
 - 3. Personal protective equipment.
 - 4. Fire safety equipment to be used in the regulated area.
- E. Submit the name, location, and phone number of the approved landfill; proof/verification the landfill is approved for ACM disposal; the landfill's requirements for ACM waste; the type of vehicle to be used for transportation; and name, address, and phone number of subcontractor, if used. Proof of asbestos training for transportation personnel shall be provided.
- F. Submit required notifications and arrangements made with regulatory agencies having regulatory jurisdiction and the specific contingency/emergency arrangements made with local health, fire, ambulance, hospital authorities and any other notifications/arrangements.
- G. Submit the name, location and verification of the laboratory and/or personnel to be used for analysis of air and/or bulk samples. Air monitoring must be done in accordance with OSHA 29 CFR 1926.1101(f) and Appendix A.
- H. Submit qualifications verification: Submit the following evidence of qualifications. Make sure that all references are current and verifiable by providing current phone numbers and documentation.
 - 1. Asbestos Abatement Company: Project experience within the past 3 years; listing projects first most similar to this project:
Project Name; Type of Abatement; Duration; Cost; Reference Name/Phone Number; Final Clearance; Completion Date

2. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years:
Project Name; Reason; Date; Reference Name/Number; Resolution
 3. List asbestos regulatory citations, penalties, damages paid and legal actions taken against the company in the last 3 years. Provide copies and all information needed for verification.
- I. Submit information on personnel: Provide a resume; address each item completely; provide references; phone numbers; copies of certificates, accreditations, and licenses. Submit an affidavit signed by the CPIH stating that all personnel submitted below have medical records in accordance with OSHA 29 CFR 1926.1101(m) and 29 CFR 1910.20 and that the company has implemented a medical surveillance program and maintains recordkeeping in accordance with the above regulations. Submit the phone number and doctor/clinic/hospital used for medical evaluations.
1. CPIH: Name; years of abatement experience; list of projects similar to this one; certificates, licenses, accreditations for proof of AHERA/OSHA specialized asbestos training; professional affiliations; number of workers trained; samples of training materials; samples of SOP's developed; medical opinion; current respirator fit test.
 2. Competent Person(s)/Supervisor(s): Number; names; social security numbers; years of abatement experience as Competent Person/Supervisor; list of similar projects as Competent Person/Supervisor; as a worker; certificates, licenses, accreditations; proof of AHERA/OSHA specialized asbestos training; maximum number of personnel supervised on a project; medical opinion; current respirator fit test.
 3. Workers: Numbers; names; social security numbers; years of abatement experience; certificates, licenses, accreditations; training courses in asbestos abatement and respiratory protection; medical opinion; current respirator fit test.
- J. Submit copies of State license for asbestos abatement; copy of insurance policy, including exclusions with a letter from agent stating in plain english the coverage provided and the fact that asbestos abatement activities are covered by the policy; copy of SOP's incorporating the requirements of this specification; information on who provides your training, how often; who provides medical surveillance, how often; who does and how is air monitoring conducted; a list of references of independent laboratories/IH's familiar with your air monitoring and standard operating procedures; copies of monitoring results of the five referenced projects listed and analytical method(s) used.

- K. When rental equipment is to be used in regulated areas or used to transport asbestos waste, the contractor shall assure complete decontamination of the rental equipment before return to the rental agency.

2.13 SUBMITTALS DURING ABATEMENT

- A. The Competent Person shall maintain and submit a daily log at the regulated area documenting the dates and times of the following: purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as critical barrier breaching, equipment failures, emergencies, and any cause for stopping work; representative air monitoring and results/TWA's/EL's. Submit this daily log to VA's representative.
- B. The CPIH shall document and maintain the following during abatement and submit as appropriate to the VA's representative.
1. Inspection and approval of the regulated area preparation prior to start of work and daily during work.
 2. Removal of any poly critical/floor barriers.
 3. Visual inspection/testing by the CPIH.
 4. Packaging and removal of ACM waste from regulated area.
 5. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the VA's representative on a weekly basis.

2.14 SUBMITTALS AT COMPLETION OF ABATEMENT

The CPIH shall submit a project report consisting of the daily log book requirements and documentation of events during the abatement project including Waste Shipment Records signed by the landfill's agent. The report shall include a certificate of completion, signed and dated by the CPIH, in accordance with Attachment #1. The VA Representative will forward the abatement report to the Medical Center after completion of the project.

PART 3 - EXECUTION

3.1 PRE-ABATEMENT MEETING

The VA representative, upon receipt, review, and substantial approval of all pre-abatement submittals and verification by the CPIH that all materials and equipment required for the project are on the site, will arrange for a pre-abatement meeting between the Contractor, the CPIH, Competent Person(s), the VA representative(s), and the VPIH/CIH. The purpose of the meeting is to discuss any aspect of the submittals needing clarification or amplification and to discuss any aspect of the

project execution and the sequence of the operation. The Contractor shall be prepared to provide any supplemental information/ documentation to the VA's representative regarding any submittals, documentation, materials or equipment. Upon satisfactory resolution of any outstanding issues, the VA's representative will issue a written order to proceed to the Contractor. No abatement work of any kind described in the following provisions shall be initiated prior to the VA written order to proceed.

3.2 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS

Before any work begins on the construction of the regulated area, the Contractor will:

- A. Conduct a space-by-space inspection with an authorized VA representative and prepare a written inventory of all existing damage in those spaces where asbestos abatement will occur. Still or video photography may be used to supplement the written damage inventory. Document will be signed and certified as accurate by both parties.
- B. The VA Representative, the Contractor, and the VPIH/CIH must be aware of 10/95 A/E Quality Alert indicating the failure to identify asbestos as applicable to Class II abatement in the areas listed. Make sure these areas are looked at/reviewed on the project.
- C. Shut down and seal with a minimum of 2 layers of 6 mil poly all HVAC systems and critical openings in the regulated area. The regulated area critical barriers shall be completely isolate the regulated area from any other air in the building. The VA's representative will monitor the isolation provision.
- D. Shut down and lock out in accordance with 29 CFR 1910.147 all electrical circuits which pose a potential hazard. Electrical arrangements will be tailored to the particular regulated area and the systems involved. All electrical circuits affected will be turned off at the circuit box outside the regulated area, not just the wall switch. The goal is to eliminate the potential for electrical shock which is a major threat to life in the regulated area due to water use and possible energized circuits. Electrical lines used to power equipment in the regulated area shall conform to all electrical safety standards and shall be isolated by the use of a ground fault circuit interrupter (GFCI). All GFCI shall be tested prior to use. The VA's representative will monitor the electrical shutdown.
- E. Inspect existing firestopping in the regulated area. Correct as needed.

3.3 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS

- A. Perform all preparatory work for the first regulated area in accordance with the approved work schedule and with this specification.

- B. Upon completion of all preparatory work, the CPIH will inspect the work and systems and will notify the VA's representative when the work is completed in accordance with this specification. The VA's representative may inspect the regulated area and the systems with the VPIH/CIH and may require that upon satisfactory inspection, Contractor's employees perform all major aspects of the approved SOP's, especially worker protection, respiratory systems, contingency plans, decontamination procedures, and monitoring to demonstrate satisfactory operation.
- C. The CPIH shall document the pre-abatement activities described above and deliver a copy to the VA's representative.
- D. Upon satisfactory inspection of the installation of and operation of systems the VA's representative will notify the Contractor in writing to proceed with the Class II asbestos abatement work in accordance with this specification.

3.4 OSHA DANGER SIGNS

Post OSHA DANGER signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following construction of the regulated area enclosure.

3.5 SHUT DOWN - LOCK OUT ELECTRICAL

Shut down and lock out electric power to the regulated area. Provide temporary power and lighting. Insure safe installation including GFCI of temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. Electricity shall be provided by the VA.

3.6 SHUT DOWN - LOCK OUT HVAC

Shut down and lock out heating, cooling, and air conditioning system (HVAC) components that are in, supply or pass through the regulated area. Investigate the regulated area and agree on pre-abatement condition with the VA's representative. Seal all intake and exhaust vents in the regulated area with duct tape and 2 layers of 6-mil poly. Also, seal any seams in system components that pass through the regulated area. Remove all contaminated HVAC system filters and place in labeled 6 mil poly disposal bags for disposal as asbestos waste.

3.7 SANITARY FACILITIES

The Contractor shall provide sanitary facilities for abatement personnel and maintain them in a clean and sanitary condition throughout the abatement project.

3.8 WATER FOR ABATEMENT

The VA will provide water for abatement purposes. The Contractor shall connect to the existing VA system.

3.9 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA

Seal off any openings from the regulated area to within any interior area with critical barriers to completely isolate the regulated area from the interior area. Should the adjacent interior area past the regulated area become contaminated due to improper work activities, the Contractor shall suspend work inside the regulated area, continue wetting, and clean the adjacent areas in accordance with procedures described in these specifications. Any and all costs associated with the adjacent area cleanup shall not be borne by the VA.

3.10 PREPARATION PRIOR TO SEALING OFF

Place all materials, equipment and supplies necessary to isolate the regulated area inside the regulated area

3.11 CONTROLLING ACCESS TO THE REGULATED AREA

Access to the regulated area shall be permitted only by the competent person. All other means of access shall be closed off by proper sealing and OSHA DANGER demarcation signs posted on the clean side of the regulated area where it is adjacent to or within view of any occupiable area.

3.12 CRITICAL BARRIERS

The regulated area must be completely separated from the adjacent interior areas by at least 2 layers of 6 mil poly and duct tape/spray adhesive. Critical barriers must remain in place until all work and visual clearances have been completed.

3.13 EXTENSION OF THE REGULATED AREA

If the regulated area barrier is breached in any manner that could allow the passage of asbestos fibers or debris, the Competent Person shall immediately stop work, continue wetting, and proceed to extend the regulated area to enclose the affected area as per procedures described in this specification. If the affected area cannot be enclosed, decontamination measures and cleanup shall start immediately. All personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection

3.14 REMOVAL OF CLASS II MATERIALS:

All applicable requirements of OSHA, EPA, and DOT shall be followed during Class II work. Keep materials intact; do not disturb; wet while working with it; wrap as soon as possible with 2 layers of 6 mil plastic for disposal.

3.15 DISPOSAL OF CLASS II WASTE MATERIAL:

Package and dispose of waste materials as per this specification. All OSHA, EPA, and DOT requirements must be met. Landfill requirements for packaging must also be met. Disposal of waste must be done in accordance with applicable regulations.

3.16 PROJECT DECONTAMINATION

- A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CPIH.

3.17 WORK DESCRIPTION

Decontamination includes the cleaning of the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including critical barriers, PDF and W/EDF facilities.

3.18 PRE-DECONTAMINATION CONDITIONS

- A. Before decontamination starts, all ACM waste from the regulated area shall be removed, all waste collected and removed, and the secondary barrier of poly removal and disposed of along with any gross debris generated by the work.
- B. At the start of decontamination, the following shall be in place:
 - 1. Critical barriers over all openings consisting of two layers of 6 mil poly which is the sole barrier between the regulated area and adjacent interior areas.
 - 2. Decontamination facilities, if required for personnel and equipment in operating condition.

3.19. CLEANING

Clean all surfaces of the regulated area by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping methods. If determined by the CPIH/VPIH/CIH additional cleaning(s) may be needed.

3.20 VISUAL INSPECTION

Notify the VA representative 24 hours in advance for the performance of the final visual inspection. The final visual inspection will be performed by the VPIH/CIH after the cleaning.

3.21 VISUAL INSPECTION

Final visual inspection will include the entire regulated area, all poly sheeting and seals over HVAC openings. If any debris, residue, dust or any other suspect material is detected, the cleaning shall be repeated at no cost to the VA. Dust/ material samples may be collected and analyzed at no cost to the VA at the discretion of the VPIH/CIH to confirm visual findings.

3.22 COMPLETION OF ABATEMENT WORK

- A. After thorough decontamination, complete asbestos abatement work upon meeting the regulated area visual clearance criteria and fulfilling the following:
1. Remove all equipment, materials, and debris from the project area.
 2. Package and dispose of all asbestos waste as required.
 3. Repair or replace all interior finishes damaged during the abatement work.
 4. Fulfill other project closeout requirements as specified elsewhere in this specification.

3.23 CERTIFICATE OF COMPLETION BY CONTRACTOR

The CPIH shall complete and sign the "Certificate of Completion" in accordance with Attachment #1 at the completion of the abatement and decontamination of the regulated area.

3.24 WORK SHIFTS

All work shall be done during administrative hours (8:00 AM to 4:30 PM) Monday - Friday excluding Federal Holidays. Any change in the work schedule must be approved in writing by the VA Representative.

ATTACHMENT #1

CERTIFICATE OF COMPLETION

DATE:

PROJECT NAME:

VAMC/ADDRESS:

1. I certify that I have personally inspected, monitored and supervised the abatement work of (specify regulated area or Building):
which took place from / / to / /
2. That throughout the work all applicable requirements/regulations and the VA's specifications were met.
3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.
4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.
5. That I performed and supervised all inspection and testing specified and required by applicable regulations and VA specifications.
6. That all Class II. work was done in accordance with OSHA, MDOT, MPCA and MDH requirements and regulations.

CPIH Name:

Signature/Date:

Asbestos Abatement Contractor's Name:

Signature/Date:

ATTACHMENT #2

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT

PROJECT NAME: _____ DATE: _____
PROJECT ADDRESS: _____
ABATEMENT CONTRACTOR'S NAME: _____

WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract with the owner for the above project requires that: You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

RESPIRATORY PROTECTION: I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

TRAINING COURSE: I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:

- Physical Characteristics and Background Information on Asbestos
- Potential Health Effects Related to Exposure to Asbestos
- Employee Personal Protective Equipment
- Establishment of a Respiratory Protection Program
- State of the Art Work Practices
- Personal Hygiene
- Additional Safety Hazards
- Medical Monitoring
- Air Monitoring
- Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
- Asbestos Waste Disposal

MEDICAL EXAMINATION: I have had a medical examination within the past 12 months which was paid for by my employer. This examination included: health history, occupational history, pulmonary function test, and may have included a chest x-ray evaluation. The physician issued a positive written opinion after the examination.

Signature: _____

Printed Name: _____

Social Security Number: _____

Witness: _____

ATTACHMENT #3

**AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND
TRAINING/ACCREDITATION**

VA PROJECT NAME AND NUMBER:

VA MEDICAL FACILITY:

ABATEMENT CONTRACTOR'S NAME AND ADDRESS:

1. I verify that the following individual

Name: _____ Social Security Number: _____

who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m)(n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address:

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.
3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.
4. I verify that I meet the minimum qualifications criteria of the VA specifications for a CPIH.

Signature of CPIH: _____ Date: _____

Printed Name of CPIH:

Signature of Contractor: _____ Date: _____

Printed Name of Contractor:

ATTACHMENT #4

**ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE VA'S
ASBESTOS SPECIFICATIONS**

VA Project Location:

VA Project #:

VA Project Description:

This form shall be signed by the Asbestos Abatement Contractor Owner and the Asbestos Abatement Contractor's Competent Person(s) prior to any start of work at the VA related to this Specification. If the Asbestos Abatement Contractor's/Competent Person(s) has not signed this form, they shall not be allowed to work on-site.

I, the undersigned, have read VA's Asbestos Specification regarding the asbestos abatement requirements. I understand the requirements of the VA's Asbestos Specification and agree to follow these requirements as well as all required rules and regulations of OSHA/EPA/DOT and State/Local requirements. I have been given ample opportunity to read the VA's Asbestos Specification and have been given an opportunity to ask any questions regarding the content and have received a response related to those questions. I do not have any further questions regarding the content, intent and requirements of the VA's Asbestos Specification.

At the conclusion of the asbestos abatement, I will certify that all asbestos abatement work was done in accordance with the VA's Asbestos Specification and all ACM was removed properly and no fibrous residue remains on any abated surfaces.

Abatement Contractor Owner's Signature _____ Date _____

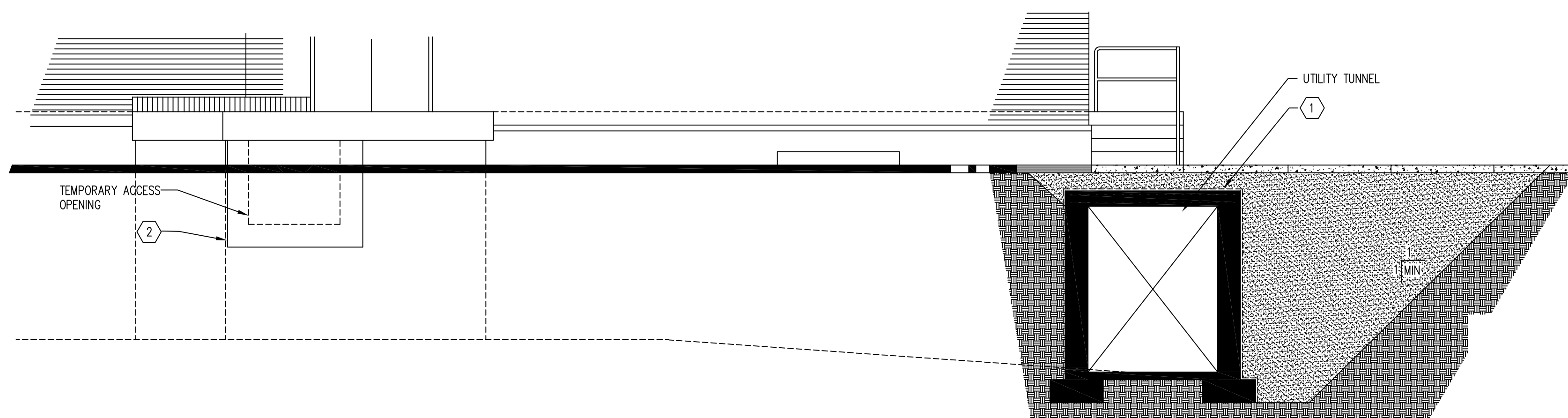
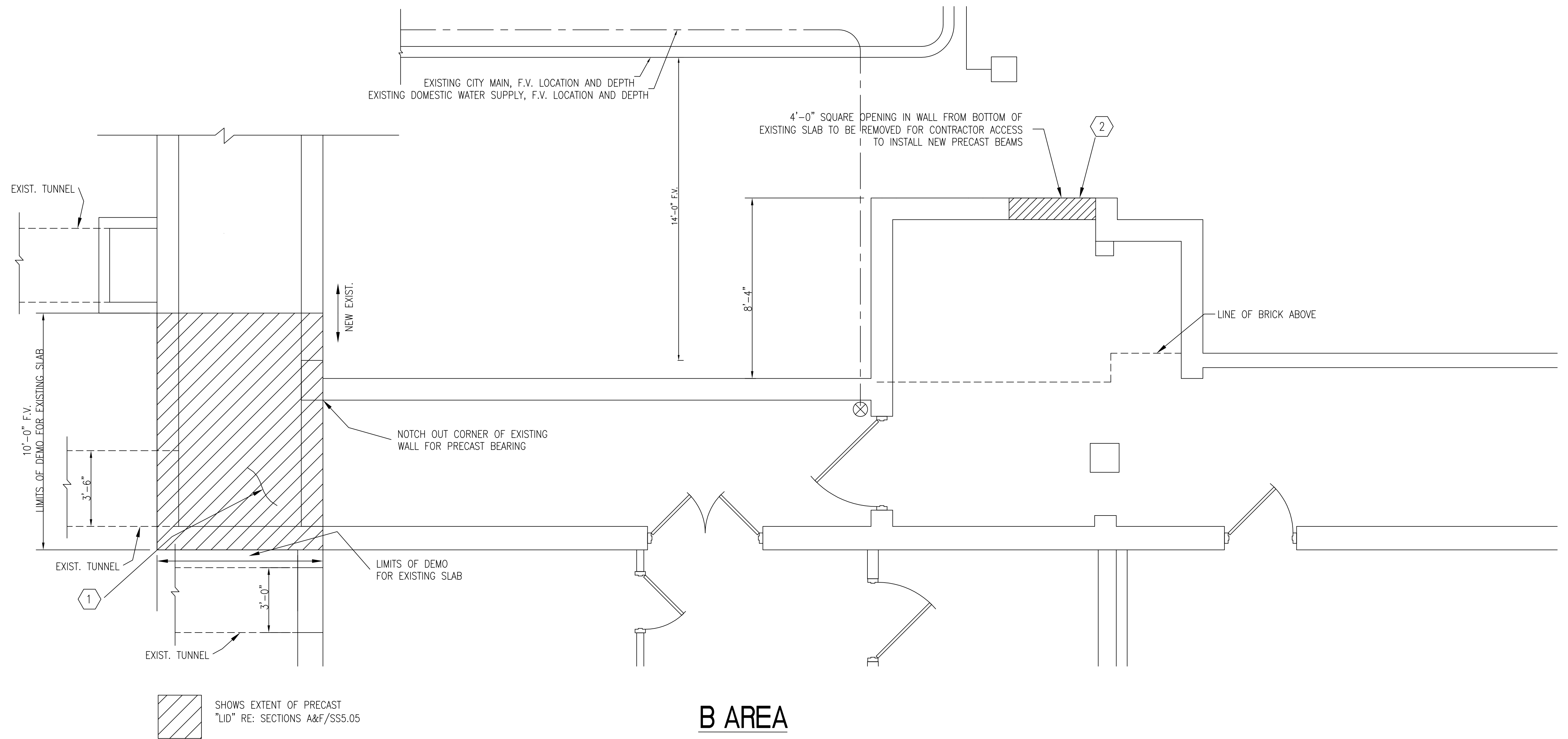
Abatement Contractor Competent Person(s) _____ Date _____

Date _____

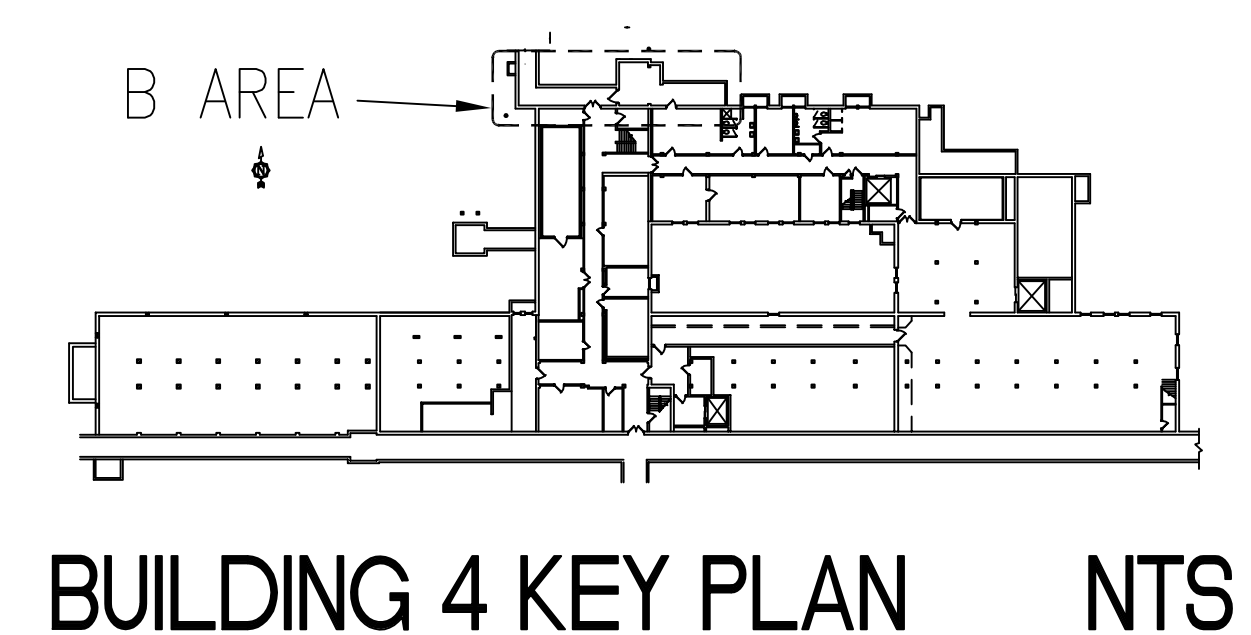
Date _____

- - - END- - -

- ASBESTOS KEYED SHEET NOTES**
- 1 REMOVE ASBESTOS-CONTAINING WATERPROOFING FROM SLAB TO A POINT PAST SAW CUT LINE PRIOR TO REMOVAL OF SLAB.
 - 2 REMOVE ASBESTOS-CONTAINING WATERPROOFING FROM ENTIRE AREA PAST SAW CUT LINES PRIOR TO REMOVAL OF ACCESS OPENING.



PARTIAL SITE PLAN/BUILDING 4 TUNNEL LEVEL-NORTH ELEVATION



No	REVISION	DATE

INSTITUTE FOR ENVIRONMENTAL ASSESSMENT
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Certified Asbestos Project Designer in the State of Minnesota.
 SIGNATURE: *[Signature]*
 Date: 11-20-2014 Certification # AD2355



TECHNICAL SERVICES AND CONSULTING
 1225 TOWER AVE
 SUPERIOR, WI 54880
 715-392-1879

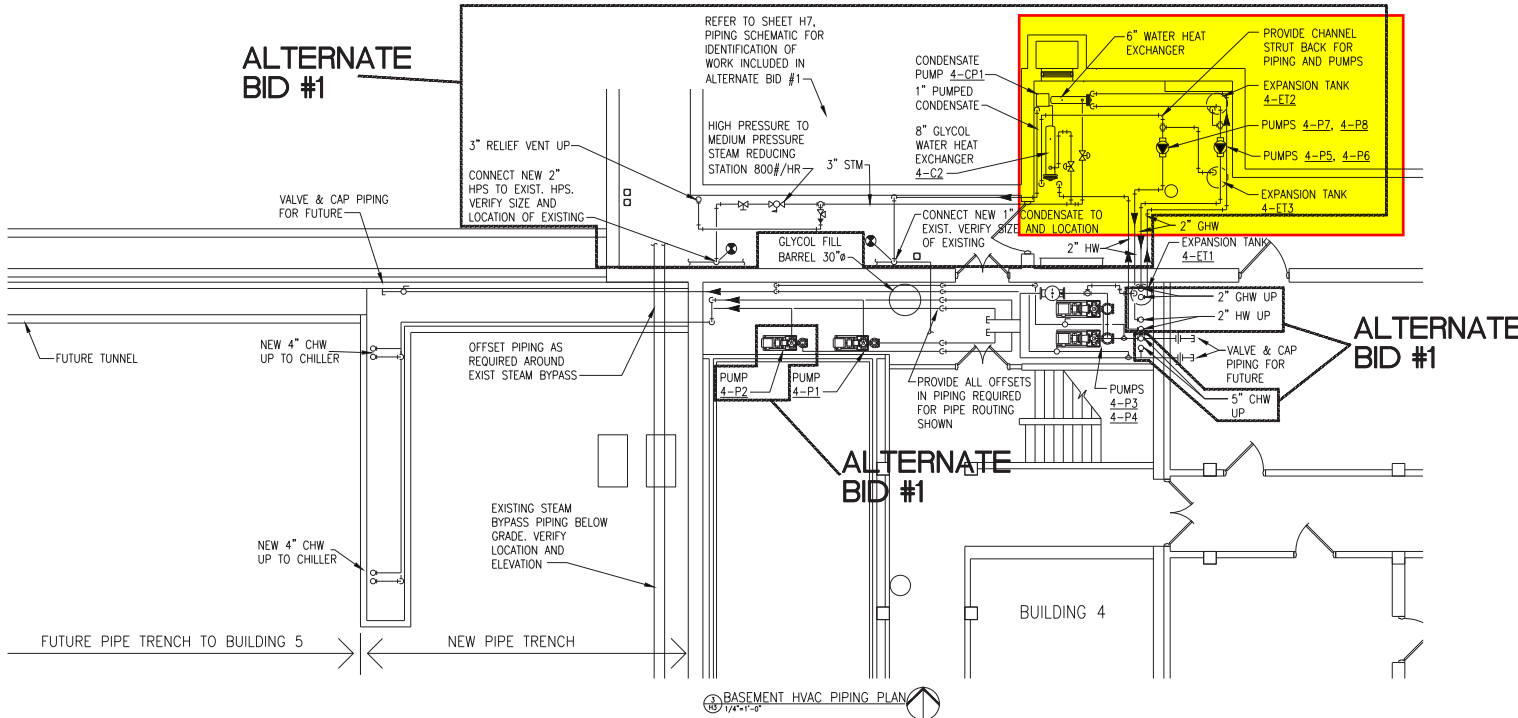
APPROVED: SERVICE LINE DIRECTOR	DATE:	APPROVED: INFECTION CONTROL NURSE	DATE:
APPROVED: DEMO COORDINATOR	DATE:	APPROVED: PATIENT SAFETY	DATE:
APPROVED: PROJECTS SECTION MANAGER	DATE:	APPROVED: CHIEF OF POLICE	DATE:
APPROVED: DIRECTOR TAGS	DATE:	APPROVED: SAFETY MANAGER	DATE:

DRAWING TITLE
BUILDING 4 ASBESTOS REMOVAL

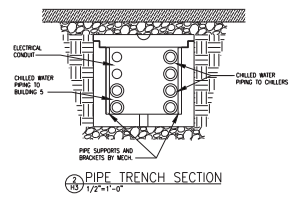
PROJECT TITLE 656-14-247 REPAIR FOUNDATIONS BUILDING 4, 7, 9a St. Cloud VA Health Care System Main Campus, St. Cloud, Minnesota	PROJECT NO.
BUILDING No: 04	ISSUED BY: WJD MJP
LOCATION VA MEDICAL CENTER ST. CLOUD, MN 56303	DRAWING NO. HA1.01 SHEET 2 OF 12



ALTERNATE BID #1



- HVAC PIPING NOTES:**
- CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING WORK AND NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES BETWEEN THE "AS-BUILT" CONDITIONS AND THESE DRAWINGS.
 - COORDINATE ALL HVAC PIPING RESTORATION WITH GENERAL, PLUMBING, FIRE PROTECTION, MECHANICAL AND ELECTRICAL CONTRACTORS. ACTUALLY ALL HVAC PIPING AS HIGH AS POSSIBLE. PROVIDE ALL HVAC NECESSARY OFFSETS (DROPS AND RISERS) TO KEEP ABOVE OTHER SYSTEMS. PROVIDE ALL HVAC PIPING TO BE ABOVE OTHER SYSTEMS.
 - REFER TO AND COORDINATE WITH THE ARCHITECTURAL PLANS FOR CEILING TYPES, HEIGHTS, SCOFF HEIGHTS, AND ALLOWANCES FOR INSTALLATION OF NEW HVAC PIPING EQUIPMENT, ETC.
 - THIS CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND RE-INSTALLATION OF EXISTING CEILING TILE NOT REMOVED BY THE GENERAL CONTRACTOR FOR THE INSTALLATION OF NEW HVAC PIPING EQUIPMENT, ETC. VERIFY WITH ARCHITECTURAL PLANS FOR CEILING WORK BY THE GENERAL CONTRACTOR. ANY CEILING TILE OR GRID DAMAGED DURING CONSTRUCTION SHALL BE REPLACED WITH NEW TILE BY THE CONTRACTOR.
 - THIS CONTRACTOR SHALL OPEN ALL EXISTING WELLS AND/OR CEILING TO INSTALL NEW HVAC PIPING, EQUIPMENT, ETC. AS REQUIRED. PATCH WELLS AND/OR CEILING TO MATCH EXISTING.
 - MAINTAIN 3'-0" CLEAR SPACE IN FRONT OF ALL ELECTRICAL, CONTROL, AND ACCESS PANELS FOR ACCESSIBILITY.
 - ALL SHUT-OFF VALVES, CONTROL VALVES, STRANDES, ETC. SHALL BE INSTALLED IN ACCESSIBLE CEILING.
 - PROVIDE 1/2" DRAIN VALVE AT ALL LOW POINTS OF EACH SYSTEM TO ENABLE COMPLETE DRAINING.
 - PROVIDE 1/2" DRAIN VALVE AT ALL HIGH POINTS OF EACH SYSTEM TO ENABLE COMPLETE FILLING.



BASEMENT HVAC PIPING PLAN
1/4" = 1'-0"

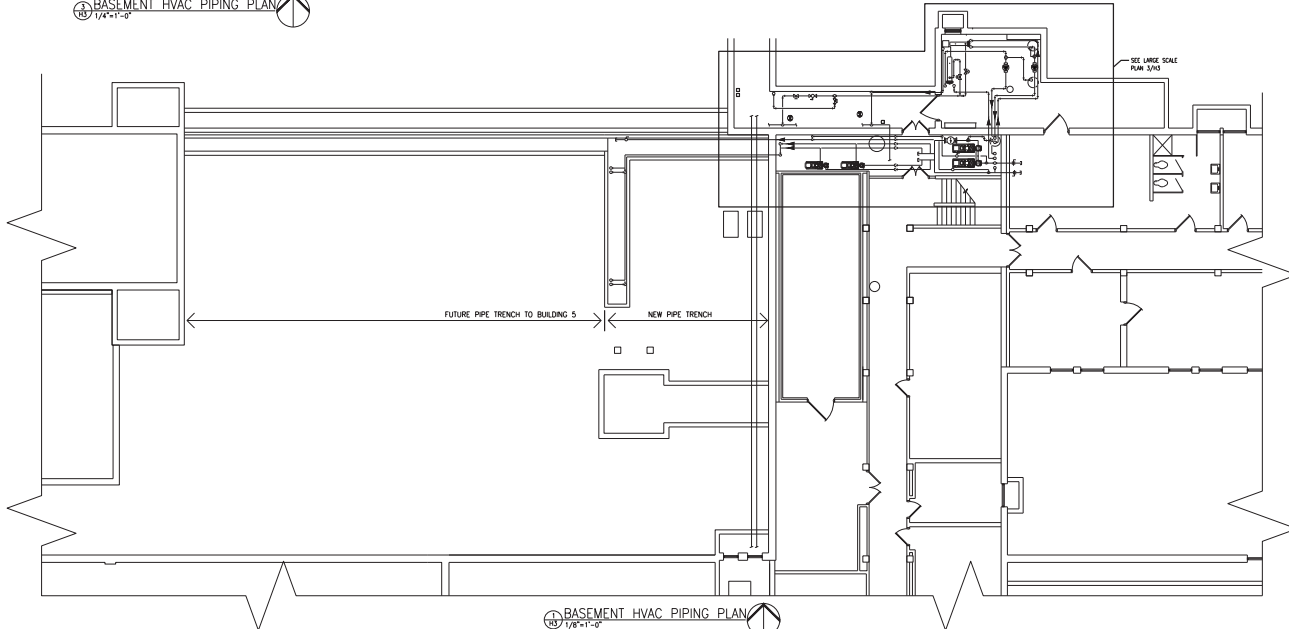


IMAGE GROUP
IMAGE GROUP INC., ARCHITECT & PLANNERS
403 CENTER AVENUE, SUITE 300
MINNEAPOLIS, MN 55401

ONE
ENGINEERING CONSULTANTS
1000 N. WASHINGTON AVENUE, SUITE 100
MINNEAPOLIS, MN 55401

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

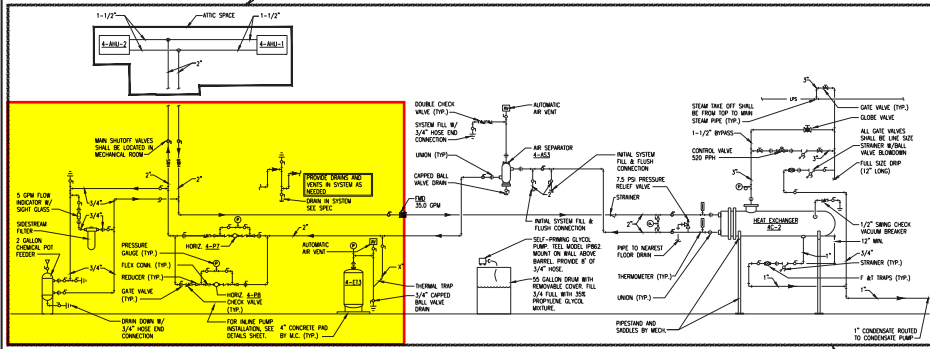
Reg. No. 19509
Date: 7/08/11
Printed Name: JAMES E. NELSON

DESIGNED BY	DATE	DESIGNED BY	DATE	PROJECT TITLE	DATE
DESIGNED BY	DATE	DESIGNED BY	DATE	BUILDING 4 HVAC SYSTEM UPGRADE	8.2.2011
DESIGNED BY	DATE	DESIGNED BY	DATE	PROJECT NO.	656-10-159
DESIGNED BY	DATE	DESIGNED BY	DATE	ISSUE NO.	08/05/11-01
DESIGNED BY	DATE	DESIGNED BY	DATE	ISSUE NO.	11.01.00

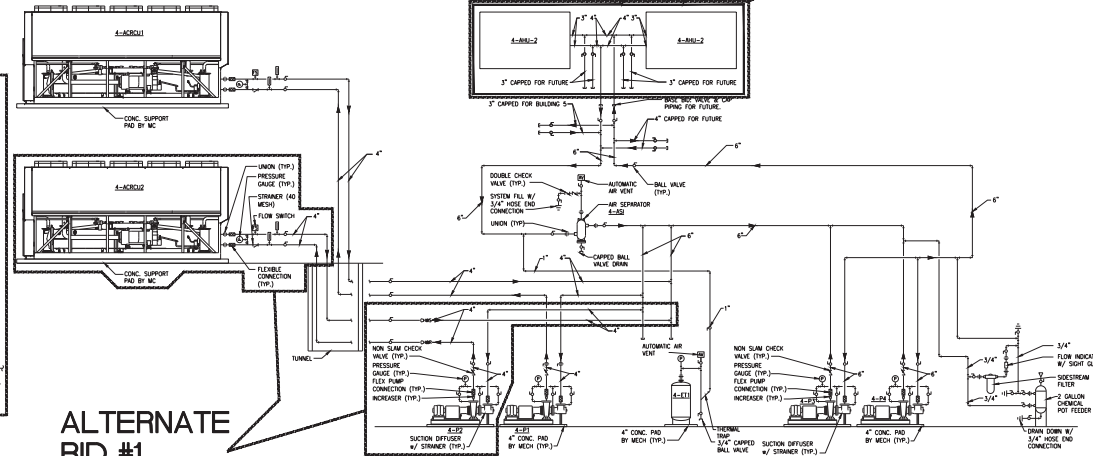


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ALTERNATE BID #1

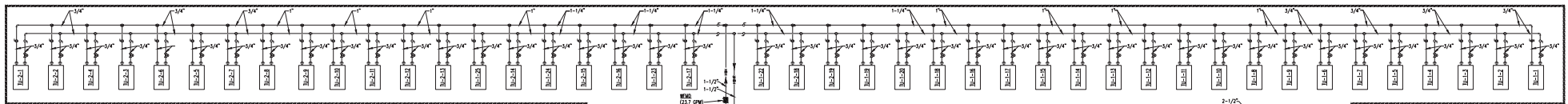


3 GLYCOL HEATING PIPING SCHEMATIC
NO SCALE

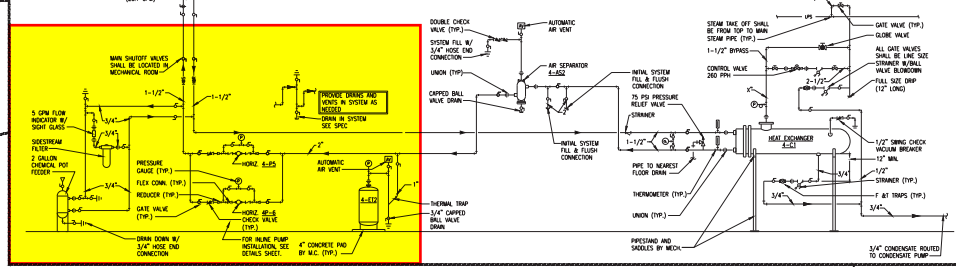


ALTERNATE BID #1

2 CHILLED WATER PIPING SCHEMATIC
NO SCALE



ALTERNATE BID #1



1 HEATING PIPING SCHEMATIC
NO SCALE



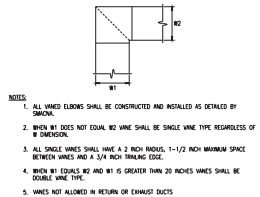
IMAGE GROUP INC. 4000 W. 13TH AVE. SUITE 300
MINNEAPOLIS, MN 55425
ONE BUILDING SYSTEMS
1000 W. 13TH AVE. SUITE 300
MINNEAPOLIS, MN 55425

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

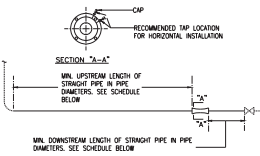
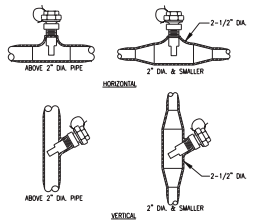
Reg. No. 19509
Date: 7/08/11
Printed Name: JAMES E. NELSON

OWNER: SERVICE LINE DIVISION	DATE: 5/11/11	DESIGNER: WINTERBURN, WASH	DATE: 5/11/11	DRAWING TITLE: HVAC PIPING SCHEMATIC	PROJECT TITLE: BUILDING 4 HVAC SYSTEM UPGRADE	DATE: JUL 9, 2011
OWNER: SERVICE LINE DIVISION	DATE: 5/11/11	DESIGNER: PATRICK STEVENS	DATE: 5/11/11	OWNER: DEPT OF STATE	DRAWING NO: 080454-117	DATE FILE: 6/56-10-159
OWNER: SERVICE LINE DIVISION	DATE: 5/11/11	DESIGNER: DEPT OF STATE	DATE: 5/11/11	OWNER: DEPT OF STATE	DRAWING NO: 080454-117	DATE FILE: 6/56-10-159
OWNER: SERVICE LINE DIVISION	DATE: 5/11/11	DESIGNER: DEPT OF STATE	DATE: 5/11/11	OWNER: DEPT OF STATE	DRAWING NO: 080454-117	DATE FILE: 6/56-10-159





1 SQUARE VANED ELBOWS
H11 NO SCALE

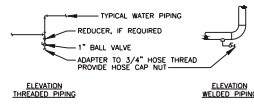


WATER FLOW MEASURING DEVICE INSTALLATION SCHEDULE

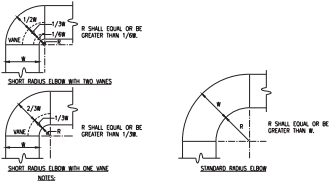
TYPE	MIN. UPSTREAM LENGTH OF STRAIGHT PIPE IN PIPES (FOR SPOOL VALVE OR TEE - OTHER FITTING)	MIN. DOWNSTREAM LENGTH OF STRAIGHT PIPE IN PIPES (DIAMETERS)
DEVICE FLANGE OR FLOATING BALL WITH IMPACT SHIELD	20	10
DEVICE WITH IMPACT SHIELD AND/OR FLOW STRAINER	10	5
ALUMINUM RINGING INSERTION VELOCITY SENSING AND MEASURING TUBE	10	2

- NOTES:**
- DIMENSIONS SHOWN IN SCHEDULE ARE MINIMUM REQUIRED. IF MANUFACTURER OF FURNISHED WATER FLOW MEASURING DEVICE RECOMMENDS A GREATER DIMENSION, USE THEIR RECOMMENDATION.
 - INSTALL THE WATER FLOW MEASURING DEVICE SO THE FLOW ARROW IS IN THE SAME DIRECTION AS THE FLOW.
 - THE WATER FLOW MEASURING DEVICE MAY BE INSTALLED IN EITHER HORIZONTAL OR VERTICAL PIPE. UNITS INCLUDING REMOTE METERS SHALL HAVE THE METER CONNECTIONS LOCATED ON OR NEAR THE SIDE WHEN INSTALLED IN HORIZONTAL PIPE. SEE SECTION "A-A". THE METER CONNECTIONS CAN BE INSTALLED IN ANY POSITION WHEN INSTALLED IN VERTICAL PIPE.

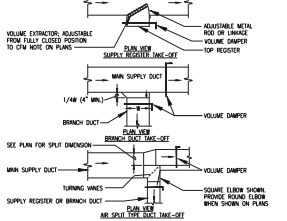
11 WATER FLOW MEASURING DEVICE INSTALLATION DETAIL
H11 NO SCALE



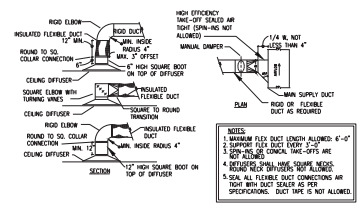
16 TYPICAL DRAIN VALVE CONNECTION
H11 NO SCALE



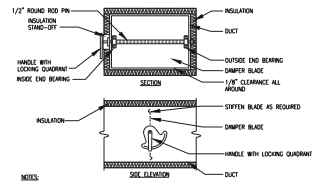
2 RADIUS ELBOWS
H11 NO SCALE



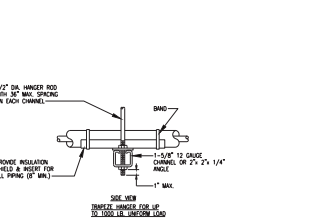
7 SUPPLY DUCT TAKE-OFFS
H11 NO SCALE



3 SUPPLY DUCT TO DIFFUSER DETAIL
H11 NO SCALE



8 TYPICAL PIPE HANGERS
H11 NO SCALE



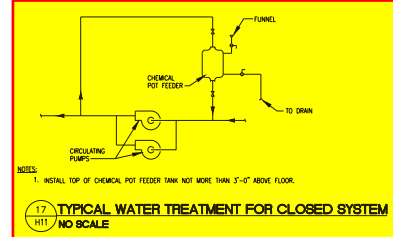
13 TYPICAL PIPE HANGERS
H11 NO SCALE

MINIMUM PIPE/HANGER SPACING SCHEDULE

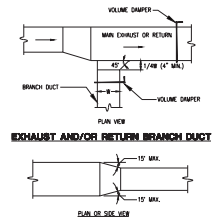
MIN. SIZE	THRU 3/4"	1	1 1/4	2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE	7.75	7.75	8.125	10.125	12.125	14.125	16.125	18.125	20.125	22.125	24.125	26.125	28.125	30	30	30
TUBING	5.75	5.75	6.125	8.125	10.125	12.125	14.125	16.125	18.125	20.125	22.125	24.125	26.125	28.125	30	30

NOTE: FOR TRAFFIC HANGER TIE SPACING OF SMALLEST SIZE ON TRAFFIC.

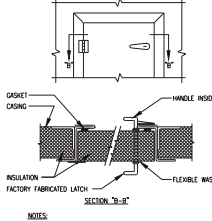
17 TYPICAL WATER TREATMENT FOR CLOSED SYSTEM
H11 NO SCALE



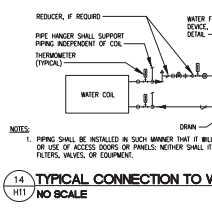
17 TYPICAL WATER TREATMENT FOR CLOSED SYSTEM
H11 NO SCALE



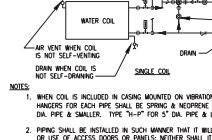
4 DUCT TRANSITION
H11 NO SCALE



9 ACCESS DOOR
H11 NO SCALE

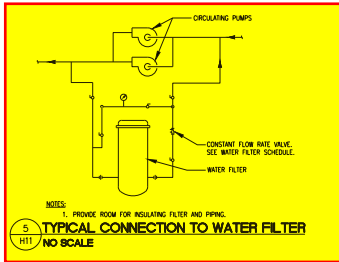
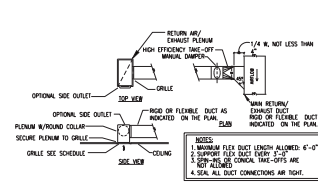


14 TYPICAL CONNECTION TO VAV COIL
H11 NO SCALE

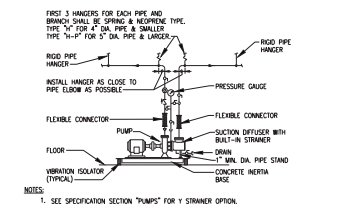


15 TYPICAL CONNECTION TO WATER COILS
H11 NO SCALE

18 RETURN/EXHAUST DUCT TO GRILLE DETAIL
H11 NO SCALE



5 TYPICAL CONNECTION TO WATER FILTER
H11 NO SCALE



10 TYPICAL CONNECTIONS TO FLOOR MOUNTED SINGLE SUCTION WATER PUMPS
H11 NO SCALE

IMAGE GROUP
403 CENTER AVENUE, SUITE 300
MINNEAPOLIS, MN 55415

ONE
BUILDING SYSTEMS
1000 - 10th Ave. S. Minneapolis, MN
763.208.8888 - 763.208.8889 - 418.444.1111

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Reg. No. 19509 Signed: *James E. Nelson*
Date: 7/08/11 Printed Name: JAMES E. NELSON

OWNER: SERVICE LINE DIVISION	DATE:	DESIGNER: INTERTECH ENGINEERING	DATE:	DRAWING TITLE: MECHANICAL DETAILS	PROJECT TITLE: BUILDING 4 HVAC SYSTEM UPGRADE	DATE: JUL 9, 2011
OWNER: SERVICE LINE DIVISION	DATE:	DESIGNER: INTERTECH ENGINEERING	DATE:	PROJECT NO: 0856-10-159	DATE: 08/11	DATE: 08/11
OWNER: SERVICE LINE DIVISION	DATE:	DESIGNER: INTERTECH ENGINEERING	DATE:	OWNER: CHIEF OF STAFF	DATE: 4/15/11	DATE: 08/11
OWNER: SERVICE LINE DIVISION	DATE:	DESIGNER: INTERTECH ENGINEERING	DATE:	OWNER: PROJECT MANAGER	DATE: JSE/EN	DATE: 08/11
OWNER: SERVICE LINE DIVISION	DATE:	DESIGNER: INTERTECH ENGINEERING	DATE:	OWNER: CHECKED BY	DATE: JSE/EN	DATE: 08/11
OWNER: SERVICE LINE DIVISION	DATE:	DESIGNER: INTERTECH ENGINEERING	DATE:	OWNER: APPROVED BY	DATE: JSE/EN	DATE: 08/11



DUCT LEAKAGE CLASSIFICATION AND ALLOWABLE LEAKAGE table with columns for DUCT PRESSURE CLASS, APPLICABLE SEALING, and TYPICAL LEAKAGE CLASS.

AIR HANDLING UNIT SOUND POWER SCHEDULE table with columns for UNIT NO., LOCATION, and SOUND POWER LEVEL values.

WATER COILS, CHILLING table with columns for COIL NO., SYSTEM, and various performance metrics.

WATER COILS, HEATING table with columns for COIL NO., SYSTEM, and various performance metrics.

ALTERNATE BID #1

DUCT PRESSURE CLASSES TABLE table with columns for FAN NO., APPLICABLE SEALING, and MIN. PRESSURE CLASS.

AIR TERMINAL UNIT SOUND REQUIREMENTS table with columns for ROOM NC, ROOM RC, and sound level values.

AIR TERMINAL UNIT SINGLE DUET table with columns for UNIT NO., LOCATION, and detailed performance data.

HVAC DESIGN DATA table with outdoor design temperatures and design altitude.

DIFFUSER, REGISTER AND GRILLE SCHEDULE table with columns for UNIT NO., MATERIAL, TYPE, and SIZE.

STEAM CONDENSATE PUMP table with columns for PUMP NO., LOCATION, and pump specifications.

CONVERTER SCHEDULE table with columns for UNIT NO., LOCATION, and converter specifications.

AIR TERMINAL UNIT SINGLE DUET table with columns for UNIT NO., LOCATION, and detailed performance data.

CIRCULATING PUMP (HVAC) SCHEDULE table with columns for UNIT NO., LOCATION, and pump specifications.

EXPANSION SCHEDULE table with columns for UNIT NO., SYSTEM, and expansion specifications.

AIR HANDLING UNIT SCHEDULE table with columns for UNIT NO., LOCATION, and air handling unit specifications.

FAN SCHEDULE table with columns for UNIT NO., LOCATION, and fan specifications.

PACKAGED AIR COOLED RECIPROCATING CHILLER UNIT table with columns for UNIT NO., EQUIP., and chiller specifications.

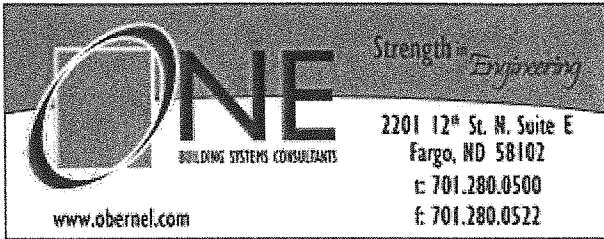


I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision... James E. Nelson

Project information table including drawing title, building name, owner, and date.



Vertical text on the left margin: 1/24/2014 08:56:43 AM...

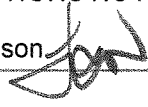


SHOP DRAWING REVIEW COMMENTS

PROJECT NAME: Building 4 HVAC, VAMC
PROJECT LOCATION: St. Coud, MN
ONE PROJECT # 2009254 SHOP DRAWING No. M1

CONTRACTOR: El-Jay Plumbing & Heating
PRODUCT MATERIAL/PRODUCT: Pumps, Air Control, Heat Exchanger
MANUFACTURER: Taco
SPECIFICATION SECTION: 232113 SCHEDULE SHEET: H12

Checking of shop drawings is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Review of the shop drawings by the Engineer or others does not relieve the contractor from his/her obligation to perform in accordance with the contract, the Drawings and Specifications, nor does it constitute an approval of any deviation from the Drawings and Specifications.

NO EXCEPTIONS NOTED MAKE CORRECTIONS NOTED REVISE / RESUBMIT REJECTED
DATE 12/5/2011 BY: Jim Nelson 

COMMENTS:

1. Heat Exchanger 4-C1 is longer with a smaller diameter than shown on the drawings. This could cause problems with tube pull as required by the Owner. Contractor shall verify tube pull clearances and resubmit heat exchanger as required.
2. Heat Exchanger 4-C2 is longer with a smaller diameter than shown on the drawings. This could cause problems with tube pull as required by the Owner. Contractor shall verify tube pull clearances and resubmit heat exchanger as required.

ONE

11-15-2011 P02:39



since 1956

7145 Boone Avenue North
Brooklyn Park, MN 55428
Phone: 763.473.4640
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Toll Free: 888.658.5513
www.rm-cotton.com

November 7, 2011



**ST. CLOUD VA MEDICAL CENTER
BUILDING 4
ST. CLOUD, MINNESOTA**

REVIEWED BY

SAGINAW CONTRACTING, INC.
BY SE DATE 11-14-11
23 21 13-01

MECHANICAL CONTRACTOR: EL-JAY PLUMBING & HEATING

PLEASE CHECK THESE SUBMITTALS CAREFULLY.
The attached list of equipment as covered by these submittals constitutes our understanding of the equipment required for this project. Any discrepancies, errors or changes must be brought to our attention prior to release of this equipment for fabrication. Please verify all motor voltages.

The following equipment is to be furnished by Taco, Inc.; Thrush, Inc.; Twin City Hose, Inc.; Skidmore; Wingert; and Vibration Isolation Company and is in accordance with the plans and specifications.

SECTION 232113-2.10B AIR SEPARATOR

- 1 - Taco #AC6F, 6" flanged Air Separator fitting, 125 PSI. ASME with built-in stainless steel dirt strainer. **For 4-AS1**
- 2 - Taco #AC2F, 2" threaded or flanged Air Separator fitting, 125 PSI. WP. with built-in dirt strainer with stainless steel screen. **For 4-AS2, 3**
- 3 - Thrush Model #720, 3/4" air vent

SECTION 232113-2.10C EXPANSION TANK

- 1 - Taco #CBX425 replaceable bladder type Expansion Tank, 125 PSI. ASME with a tank volume of 112 gallons and an acceptance volume of 61 gallons. Tank to be complete with a ring base and factory pre-charge of 12 PSI. **For 4-ET1**
- 2 - Taco #CBX254 replaceable bladder type Expansion Tank, 125 PSI. ASME with a tank volume of 67 gallons and an acceptance volume of 34 gallons. Tank to be complete with a ring base and factory pre-charge of 12 PSI. **For 4-ET2, 3**
- 3 - Thrush Model #706, 3/4" air vent

SECTION 232123-2.1B IN-LINE PUMPS (ALT 1)

- 2 - Taco #1919C/6.8, 2" in line pump, bronze fitted and close coupled with 2 HP, 1750 RPM, 460/60/3 ODP, premium efficiency motors. Capacity of 25 GPM at 45 ft. head. **For 4-P5, 6**
- 2 - Taco #1919C/7.2, 2" in line pump, bronze fitted and close coupled with 2 HP, 1750 RPM, 460/60/3 ODP, premium efficiency motors. Capacity of 35 GPM at 50 ft. head. **For 4-P7, 8**
- 4 - Taco #1600-868CRP, spare water seal for the above pumps.

Note: Drawing shows flex connectors for the above pumps. We do not recommend flex connectors with this style of pump. The pumps should be mounted directly to rigid pipe and no supports for the motor should be used.

(Continued)

SECTION 232123-2.1C BASE MOUNTED PUMPS

- 1 - Taco #FI3007/6.3, 4 x 3" base mounted, end suction, bronze fitted centrifugal pumps with regreasable bearings, OSHA guard, 2 HP (H0010D), 1160 RPM, 460/60/3 ODP, premium efficiency motor. Pump to have a capacity of 200 GPM at 15 ft. head for **4-P1**.
- 2- Taco #FI3009/8.7, 4 x 3" base mounted, end suction, bronze fitted centrifugal pumps with regreasable bearings, OSHA guard, 10 HP (H0051D), 1760 RPM, 460/60/3 ODP, premium efficiency motors. Each pump to have a capacity of 425 GPM at 55 ft. head for **4-P3, 4**.
- 3 - Taco #951-3162RP, spare water seal for the above pumps.
- 1 -Taco #953-568RP, spare body gasket.
- 2-Taco #953-1009RP, spare body gasket.
- 1 - Taco #SD040040-1J, 4 x 4" flanged x flanged Suction Diffusers with strainer, adjustable foot and start-up screen for **4-P1**.
- 2 - Taco #SD060040-1J, 6 x 4" flanged x flanged Suction Diffusers with strainer, adjustable foot and start-up screen for **4-P3, 4**.
- 1 - Twin City Hose #TCHS400, 4" x 14" OAL, T321 SS hose & braid with flanged ends for piping connections. (suction side) **4-P1**
- 1 - Twin City Hose #RCFF0403, 4" x 3" x 17" OAL, T321 SS hose & braid with flanged ends and with a concentric reducer. (discharge side) **4-P1**
- 2 - Twin City Hose #TCHS600, 6" x 16" OAL, T321 SS hose & braid with flanged ends for piping connections. (suction side) **4-P3, 4**
- 2 - Twin City Hose #RCFF0603, 6" x 3" x 21" OAL, T321 SS hose & braid with flanged ends and with a concentric reducer. (discharge side) **4-P3, 4**
- 1- Taco #FI3007/6.3, 4 x 3" base mounted, end suction, bronze fitted centrifugal pumps with regreasable bearings, OSHA guard, 2 HP (H0010D), 1160 RPM, 460/60/3 ODP, premium efficiency motor. Pump to have a capacity of 200 GPM at 15 ft. head for **4-P2**.
- 1 - Taco #951-3162RP, spare water seal for the above pumps.
- 1-Taco #953-568RP, spare body gasket.
- 1 - Taco #SD040040-1J, 4 x 4" flanged x flanged Suction Diffusers with strainer, adjustable foot and start-up screen for **4-P2**.
- 1 - Twin City Hose #TCHS400, 4" x 14" OAL, T321 SS hose & braid with flanged ends for piping connections. (suction side) **4-P2**
- 1 - Twin City Hose #RCFF0403, 4" x 3" x 17" OAL, T321 SS hose & braid with flanged ends and with a concentric reducer. (discharge side) **4-P1**

Note: Controls By Others

NO SPEC CONDENSATE PUMP (ALT 1)

- 1 - Skidmore Model PC6N Simplex Condensate Return System with a 6 gallon cast iron receiver and one vertical, close coupled centrifugal pumps with bronze impellers, mechanical seals and close coupled with a 1/3 HP, 3450 RPM, 115/230-60-1 ODP motors wired for 115 volt operation. Each pump to have a capacity of 6 GPM against a 20 PSI discharge pressure. Unit to be complete with a float switch. **For 4-CP1**

SECTION 232213-2.9 HEAT EXCHANGERS (ALT 1)

- 1 - Taco #G04208-S, 4" diameter, 2 pass unit with 4.0 ft. long tube bundle and to have a capacity to heat 25 GPM of water from 160 to 180 deg. F. in the tubes when using 5 PSIG. steam in the shell. Unit to be ASME stamped and certified for 125 PSIG. WP. and to be furnished with a pair of steel saddles. **For 4-C1.**
- 1 - Taco #E06210-S, 6" diameter, 2 pass unit with 5 ft. long tube bundle and to have a capacity to heat 35 GPM of 35% PG water from 150 to 180 deg. F. in the tubes when using 5 PSI steam in the shell. Unit to be ASME stamped and certified for 150 PSIG. WP. and to be furnished with a pair of steel saddles. **For 4-C2.**
- 2 - Barnes & Jones #VB3875, 3/4" Vacuum Breaker.

(Continued)

SECTION 23500-2.2D BYPASS FEEDER

3 - Wingert #DB-5HD, Vertical bypass feeder, 6.3 gallon, rated for 200 psi and furnished with 3/4" FNPT tappings for inlet, outlet and drain.

SECTION 230541 INERTIA BASES

4 - Vibration Isolation Co., "Redipour" concrete inertia base pouring forms, complete with structural steel perimeter channel, equipment locating templates, reinforcing rod welded in place, height savings brackets, ViFlex Series "OM" free standing open spring mountings, 6" thick with 1" spring deflection and extension to support the suction diffuser. For 4-P1, P2, P3, P4

Submitted by:

John Lally

RM Cotton Company

763-489-2465

jlally@rmcotton.com



Submittal Data Information

Air Separator

401-001

EFFECTIVE: MAY 31, 2003

SUPERSEDES: 401-001 DATED AUGUST 5, 1987

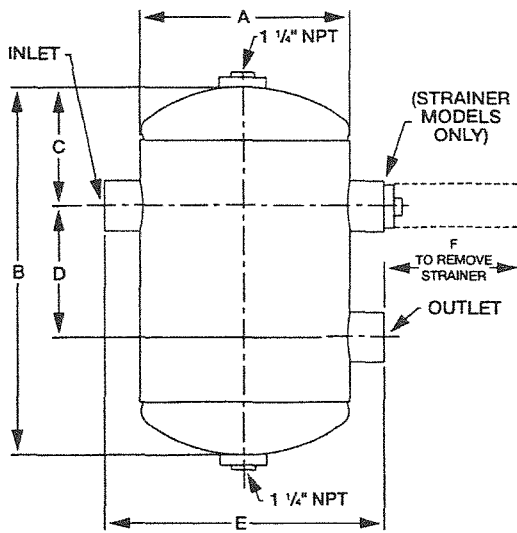
JOB *St Cloud VA Medical Center* ENGINEER _____

CONTRACTOR *El Jay Plumbing & Heating*

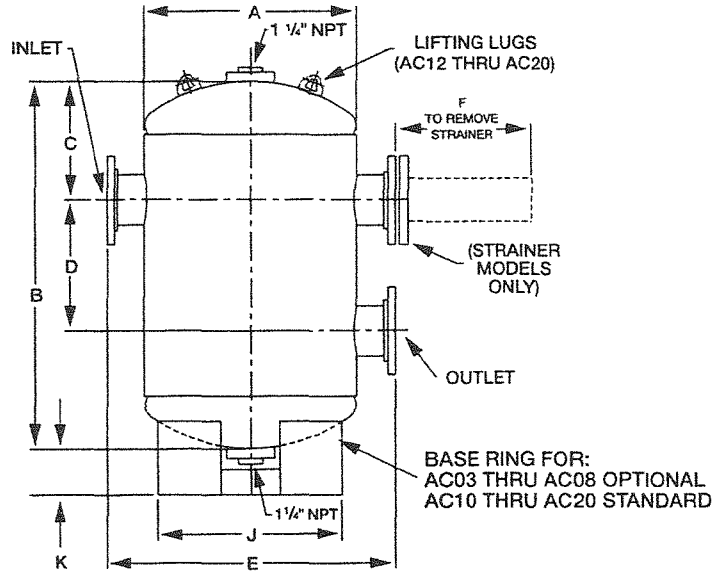
REP. *R.M. Cotton Company*

ITEM	QUANTITY	MODEL NUMBER	SIZE
4-ASI	1	AC6F	6"

DIMENSIONS



AC02F - AC025F



AC03F - AC20F

PIPE SIZE (inches)	PRODUCT NUMBER		A	B MAX	C	D	E	F	J	K	MAX FLOW (gpm)	Strainer Free Area (Sq. In.)	Less Strainer C _v Factor	With Strainer C _v Factor	APPROX SHIPPING WGT.	
	Less Strainer	With Strainer													Less Strainer	With Strainer
2	AC2	AC2F	8.625	18.00	6.31	5.38	10.88	13			80	22	86	72	32	37
2.5	AC25	AC25F	10.750	20.00	7.06	5.88	13.00	16			130	34	122	102	72	78
3	AC3	AC3F	14	27.25	8.00	11.25	20.75	19	12*	6 ³ / ₄ *	190	51	190	162	92	120
4	AC4	AC4F	16	31.30	9.32	12.75	25.25	19	12*	6 ³ / ₄ *	330	80	325	272	140	176
5	AC5	AC5F	16	31.39	8.82	13.75	25.25	22	12*	6 ³ / ₄ *	550	112	510	422	180	228
6	AC6	AC6F	20	34.88	10.06	14.75	29.25	26	16*	6 ¹ / ₂ *	900	180	750	618	240	290
8	AC8	AC8F	20	45.50	14.06	17.38	29.75	28	16*	6 ¹ / ₂ *	1500	246	1260	1060	322	416
10	AC10	AC10F	24	47.50	14.81	17.88	34.75	32	20	6 ³ / ₄	2600	392	2000	1670	545	670
12	AC12	AC12F	30	56.94	16.85	23.25	42.00	37	22	7 ¹ / ₂	3400	548	2900	2400	860	1060
14	AC14	AC14F	36	65.00	19.88	25.25	48.75	43	24	7 ¹ / ₂	4700	732	3500	2850	980	1170
16	AC16	AC16F	36	71.50	21.75	28.00	49.75	44	24	7 ¹ / ₂	6000	845	4600	3800	1200	1300
18	AC18	AC18F	42	74.81	22.59	29.63	55.75	51	30	7 ¹ / ₂	8000	1125	5900	4900	1648	1764
20	AC20	AC20F	48	82.81	25.28	32.25	62.25	58	36	7 ¹ / ₂	10000	1435	7400	6200	2600	3200

Model No. -4 for 125 PSI, Example AC10-4
Model No. -6 for 150 PSI, Example AC10-6

Standard Rated @ 125 PSI @ 375°F
Designed and Constructed per ASME Section VIII Div. 1

* Optional

Do it Once. Do it Right.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 FAX: (401) 942-2360.
TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436.

Visit our web site at: <http://www.taco-hvac.com>

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Submittal Data Information

Air Separator

401-001

EFFECTIVE: MAY 31, 2003

SUPERSEDES: 401-001 DATED AUGUST 5, 1987

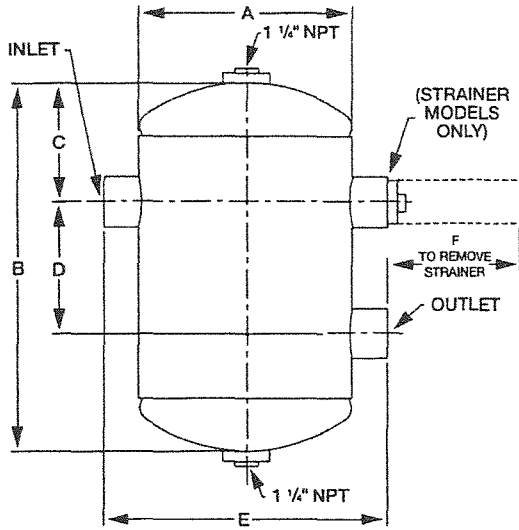
JOB St Cloud VA Medical Center ENGINEER _____

CONTRACTOR El Jay Plumbing & Heating

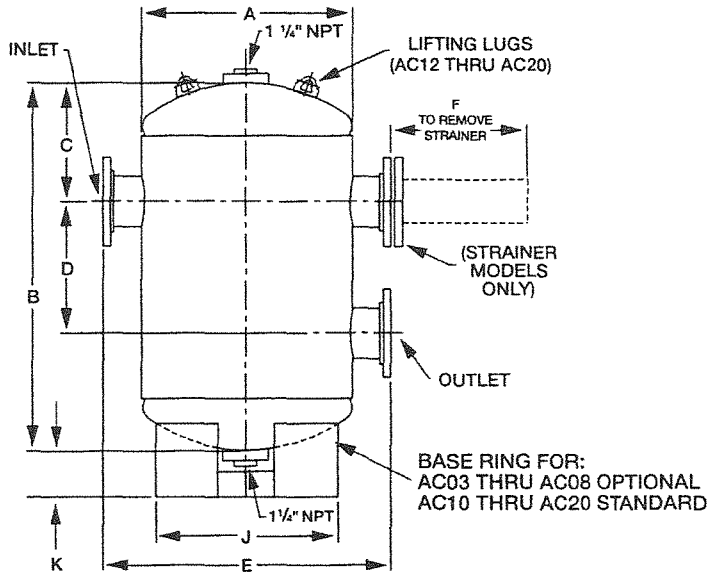
REP. R.M. Cotton Company

ITEM	QUANTITY	MODEL NUMBER	SIZE
4-AS2&3	2	AC2F	2"

DIMENSIONS



AC02F - AC025F



AC03F - AC20F

PIPE SIZE (inches)	PRODUCT NUMBER		A	B MAX	C	D	E	F	J	K	MAX FLOW (gpm)	Strainer Free Area (Sq. In.)	Less Strainer C _v Factor	With Strainer C _v Factor	APPROX SHIPPING WGT.	
	Less Strainer	With Strainer													Less Strainer	With Strainer
2	AC2	AC2F	8.625	18.00	6.31	5.38	10.88	13			80	22	86	72	32	37
2.5	AC25	AC25F	10.750	20.00	7.06	5.88	13.00	16			130	34	122	102	72	78
3	AC3	AC3F	14	27.25	8.00	11.25	20.75	19	12*	6 ³ / ₄ *	190	51	190	162	92	120
4	AC4	AC4F	16	31.30	9.32	12.75	25.25	19	12*	6 ³ / ₄ *	330	80	325	272	140	176
5	AC5	AC5F	16	31.39	8.82	13.75	25.25	22	12*	6 ³ / ₄ *	550	112	510	422	180	228
6	AC6	AC6F	20	34.88	10.06	14.75	29.25	26	16*	6 ¹ / ₂ *	900	180	750	618	240	290
8	AC8	AC8F	20	45.50	14.06	17.38	29.75	28	16*	6 ¹ / ₂ *	1500	246	1260	1060	322	416
10	AC10	AC10F	24	47.50	14.81	17.88	34.75	32	20	6 ³ / ₄	2600	392	2000	1670	545	670
12	AC12	AC12F	30	56.94	16.85	23.25	42.00	37	22	7 ¹ / ₂	3400	548	2900	2400	860	1060
14	AC14	AC14F	36	65.00	19.88	25.25	48.75	43	24	7 ¹ / ₂	4700	732	3500	2850	980	1170
16	AC16	AC16F	36	71.50	21.75	28.00	49.75	44	24	7 ¹ / ₂	6000	845	4600	3800	1200	1300
18	AC18	AC18F	42	74.81	22.59	29.63	55.75	51	30	7 ¹ / ₂	8000	1125	5900	4900	1648	1764
20	AC20	AC20F	48	82.81	25.28	32.25	62.25	58	36	7 ¹ / ₂	10000	1435	7400	6200	2600	3200

Model No. -4 for 125 PSI, Example AC10-4
 Model No. -6 for 150 PSI, Example AC10-6

Standard Rated @ 125 PSI @ 375°F
 Designed and Constructed per ASME Section VIII Div. 1

* Optional

Do it Once. Do it Right.

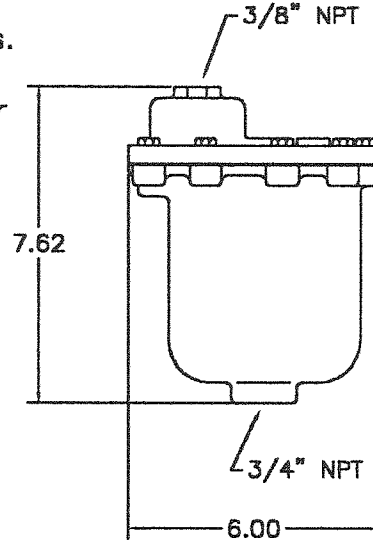
TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 FAX: (401) 942-2360.
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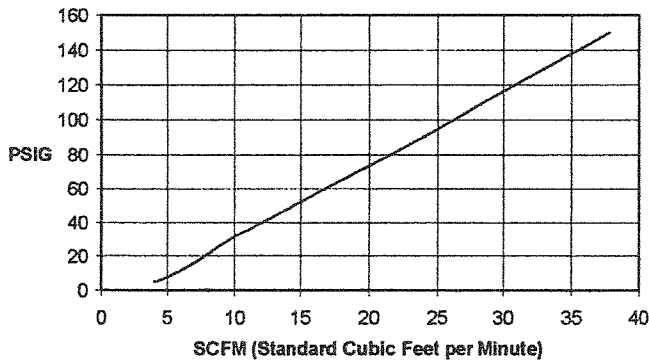
An innovative approach to the problem of eliminating air from HVAC system piping.

- Positive venting action at all operating pressures.
- Large $\frac{5}{32}$ " orifice eliminates large volumes of air at low as well as high pressures.
- Designed to eliminate air as fast as it can be separated.
- Self cleaning operating mechanism provides maintenance free operation.
- Rapid positive seating action.
- Will not open if negative pressure occurs so air cannot be drawn into the system. Ideal for use with air elimination and de-aeration procedures.



Operating Pressures 0 PSIG to 150 PSIG
Max. Temperature 250° F

Air Elimination vs. System Pressure



Materials of Construction

Description	Standard Construction
Body	Cast Iron
Cover	Cast Iron
Bolts and Nuts	Stainless Steel
Vent Mechanism	Bronze

Job Name: St Cloud VA med ctr
 Location: St Cloud, mn
 Engineer: _____
 Contractor: EL Jay P + H

Representative: Rm cotton
 Model No: 720
 Notes: _____



Submittal Data Information CBX Expansion Tanks

401-045

SUPERSEDES: New

EFFECTIVE: July 9, 2001

Job: *St Cloud VA Medical Center*

Quantity	Item No.	Model No.	Precharge*	Working Pressure
<i>1</i>	<i>4-ET1</i>	<i>CBX425</i>	<i>12.00</i>	<i>125.00</i>

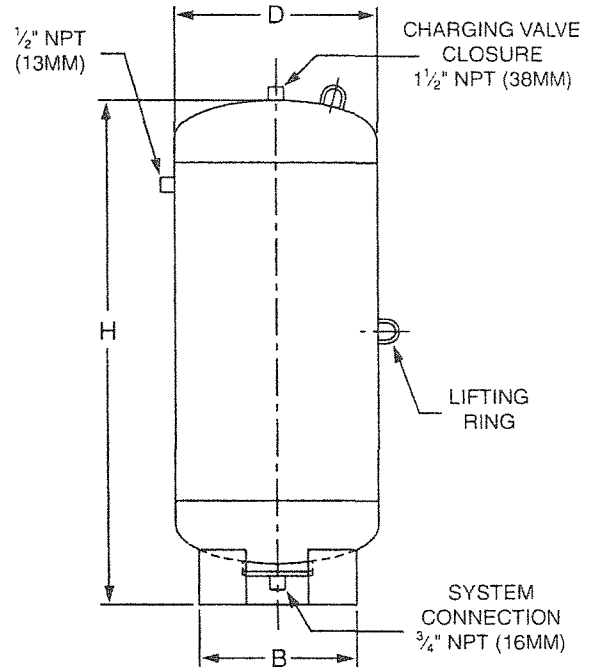
*Unless otherwise specified, standard precharge of 12 PSIG. (83 KPa)

CONSTRUCTION

- Bladder type for permanent separation of air and water.
- Water expands into bladder. Air precharge on shell side.

SPECIFICATIONS

- Shell – Fabricated Steel designed and constructed per ASME Section VIII, Div. 1.
- Bladder – Heavy Duty Butyl removable for inspection.
- Working Pressure – 125 PSIG (862 KPa) (150 PSIG optional).
- Operating Temperature – 240°F (116°C) Max.
- Lifting rings not included on CBX 15, CBX 30 and CBX 42.
- Not for use with potable water.
- **VERTICAL INSTALLATION ONLY.**



MODEL NUMBER	TANK VOLUME		ACCEPT. VOLUME		H HEIGHT		B DIAMETER		D DIAMETER		SHIPPING WEIGHT	
	GAL.	LIT.	GAL.	LIT.	INCH	MM	INCH	MM	INCH	MM	LBS.	Kg
CBX15	4	15	2.5	9.5	15	381	10	254	14	356	45	21
CBX30	8	30	5	19	22 ³ / ₁₆	564	12	305	14	356	90	41
CBX42	11	42	5	19	27 ⁹ / ₁₆	690	12	305	14	356	105	48
CBX84	22	84	12	45	38 ⁹ / ₁₆	980	12	305	16	406	150	68
CBX130	34	130	19	72	37 ¹⁵ / ₁₆	964	12	305	20	508	200	91
CBX170	45	170	24	91	43 ⁵ / ₈	1108	12	305	20	508	240	109
CBX254	67	254	34	129	48 ¹³ / ₁₆	1240	16	406	24	610	280	127
CBX300	79	300	43	163	55 ⁵ / ₁₆	1405	20	508	24	610	300	136
CBX350	92	350	43	163	62 ⁵ / ₁₆	1583	20	508	24	610	330	150
CBX425	112	425	61	231	72	1829	20	508	24	610	380	172
CBX500	132	500	61	231	82 ⁷ / ₁₆	2094	20	508	24	610	425	193
CBX600	160	600	100	375	68	1727	24	610	30	762	515	234



COMMENTS:

Do it Once. Do it Right.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 FAX: (401) 942-2360.
 TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436.
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Submittal Data Information CBX Expansion Tanks

401-045

SUPERSEDES: New

EFFECTIVE: July 9, 2001

Job: *St Cloud VA Medical Center*

Quantity	Item No.	Model No.	Precharge*	Working Pressure
2	4-ET2&3	CBX254	12.00	125.00

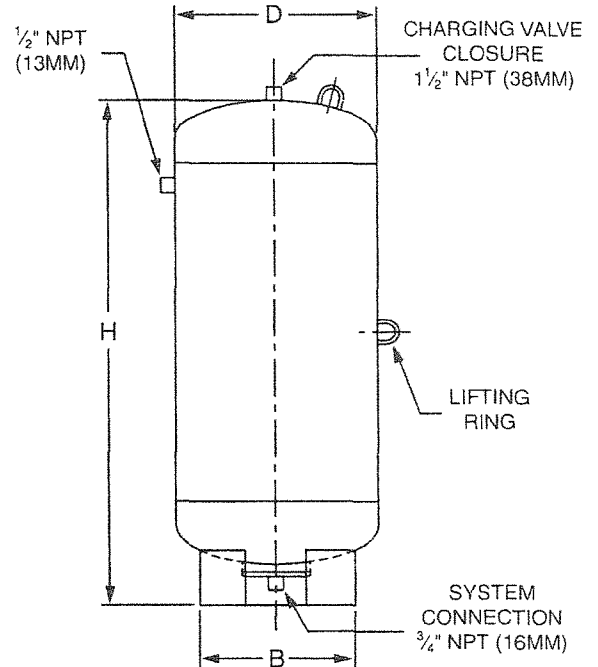
*Unless otherwise specified, standard precharge of 12 PSIG. (83 KPa)

CONSTRUCTION

- Bladder type for permanent separation of air and water.
- Water expands into bladder. Air precharge on shell side.

SPECIFICATIONS

- Shell - Fabricated Steel designed and constructed per ASME Section VIII, Div. 1.
- Bladder - Heavy Duty Butyl removable for inspection.
- Working Pressure - 125 PSIG (862 KPa) (150 PSIG optional).
- Operating Temperature - 240°F (116°C) Max.
- Lifting rings not included on CBX 15, CBX 30 and CBX 42.
- Not for use with potable water.
- **VERTICAL INSTALLATION ONLY.**



MODEL NUMBER	TANK VOLUME		ACCEPT. VOLUME		H HEIGHT		B DIAMETER		D DIAMETER		SHIPPING WEIGHT	
	GAL.	LIT.	GAL.	LIT.	INCH	MM	INCH	MM	INCH	MM	LBS.	Kg
CBX15	4	15	2.5	9.5	15	381	10	254	14	356	45	21
CBX30	8	30	5	19	22 3/16	564	12	305	14	356	90	41
CBX42	11	42	5	19	27 3/16	690	12	305	14	356	105	48
CBX84	22	84	12	45	38 9/16	980	12	305	16	406	150	68
CBX130	34	130	19	72	37 15/16	964	12	305	20	508	200	91
CBX170	45	170	24	91	43 5/8	1108	12	305	20	508	240	109
CBX254	67	254	34	129	48 13/16	1240	16	406	24	610	280	127
CBX300	79	300	43	163	55 5/16	1405	20	508	24	610	300	136
CBX350	92	350	43	163	62 5/16	1583	20	508	24	610	330	150
CBX425	112	425	61	231	72	1829	20	508	24	610	380	172
CBX500	132	500	61	231	82 7/16	2094	20	508	24	610	425	193
CBX600	160	600	100	375	68	1727	24	610	30	762	515	234



COMMENTS:

Do it Once. Do it Right.

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TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436.

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SUBMITTAL DATA

Model 706 Automatic Air Vent

Operation

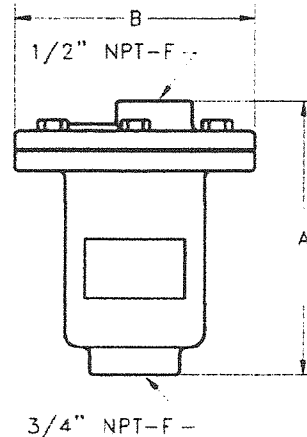
The automatic #706 Air Vent has been designed for use on any hydronic or water service system where pressure does not exceed 150 PSIG and the temperature is no greater than 240 degrees F. The #706 Air Vent should be installed in an accessible location at the high points of the system.

Installation

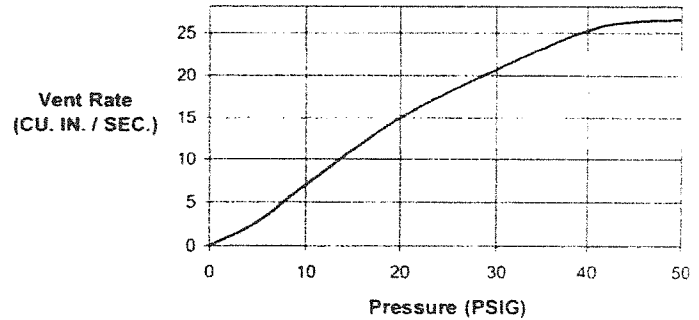
In a hydronic heating system, air removal can be accomplished most efficiently by installing a #706 Air Vent with a properly sized Air Purger or Air Separator. The purger separates the air from the water and diverts it to the Air Vent for quick and automatic removal. A 3/4" NPT tapping is provided on the Air Vent for this connection.

Maintenance

Since any vent may occasionally require cleaning when the system contains dirt or sludge, it is common procedure to install a gate valve to isolate the vent. The #706 Air Vent may be cleaned simply by removing the flange bolts, lifting out the inner assembly and washing off the strainer. Allow 6" clearance above the top of the #706 Air Vent for removal of this assembly.



706 Vent Rate



Model	Part Number	Conn Size	Material Internal	Material Body	Wt. (lbs)	A (in)	B (in)	Working Pressure
706	706-1	3/4"	Brass	Cast Iron	6	5.12"	4.25"	150 PSIG

Job Name St Cloud VA med ctr
 Location St Cloud, mn
 Engineer _____
 Architect _____
 Sales Rep. Rm cotton
 Contractor El Jay P+H

Model Number 706
 Notes _____



Submittal Data Information

1900 Series Pumps

201-244T

MODEL 1919

1750 RPM

JOB: St Cloud VA Medical Center

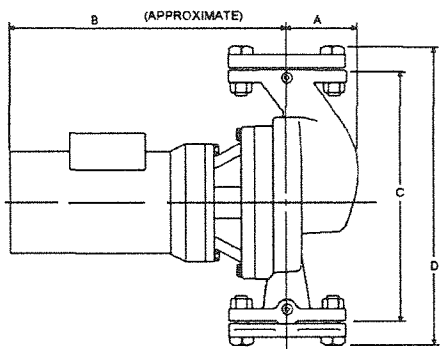
CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

REP: RM Cotton

COMMENTS: Section 232123-2.1B

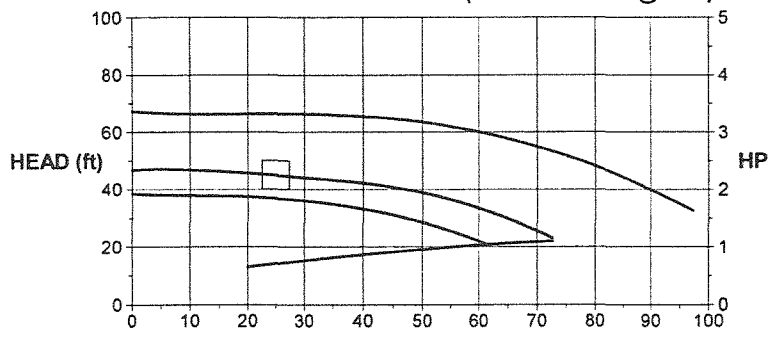
ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
4-P5&6	1919	6.8	25	45	2	460/60/3



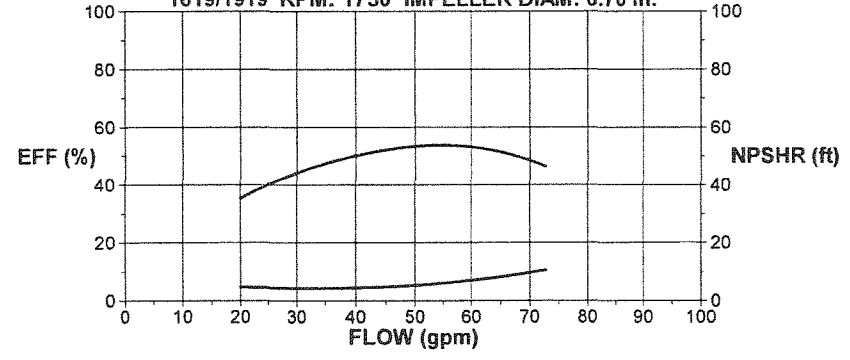
* Dimensions in inches. Do not use for construction purposes unless certified.

Flange Size	HP	A	B	C	D
2	2	3	17-3/4	14-1/2	17-3/8

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



1619/1919 RPM: 1750 IMPELLER DIAM: 6.76 in.



SPECIFICATIONS:

MOTORS

1750 RPM, Three Phase, 208/230/460V, 60Hz, Nema 56 C Frame Motors.
 Also available in Single Phase 115/208/230V, 1/4 HP - 1 1/2 HP.
 Motors are Nema 56 C Frame, sealed ball bearing design, and require no maintenance.

BODY

Cast Iron with in-line flanged connections. Also available in optional all bronze. Companion flanges available with the pump.

IMPELLER

One Piece Cast Bronze, Closed, Dynamically Balanced Impeller.

DRIVE

Close Coupled Direct Driven Pump.

SHAFT

Alloy Steel with Cupro Nickel Shaft Sleeve.

MECHANICAL SEAL

2 Piece Standard 250F (121C) Max. Operating Temp. Optional 300F (149C) Max. Operating Temp.

WORKING PRESSURE

175 PSI (1207kPa) in accordance with ASA B16.1.
 NOTE: Pump flanges are tapped for gauges.

Do it once. Do it right.

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 TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436

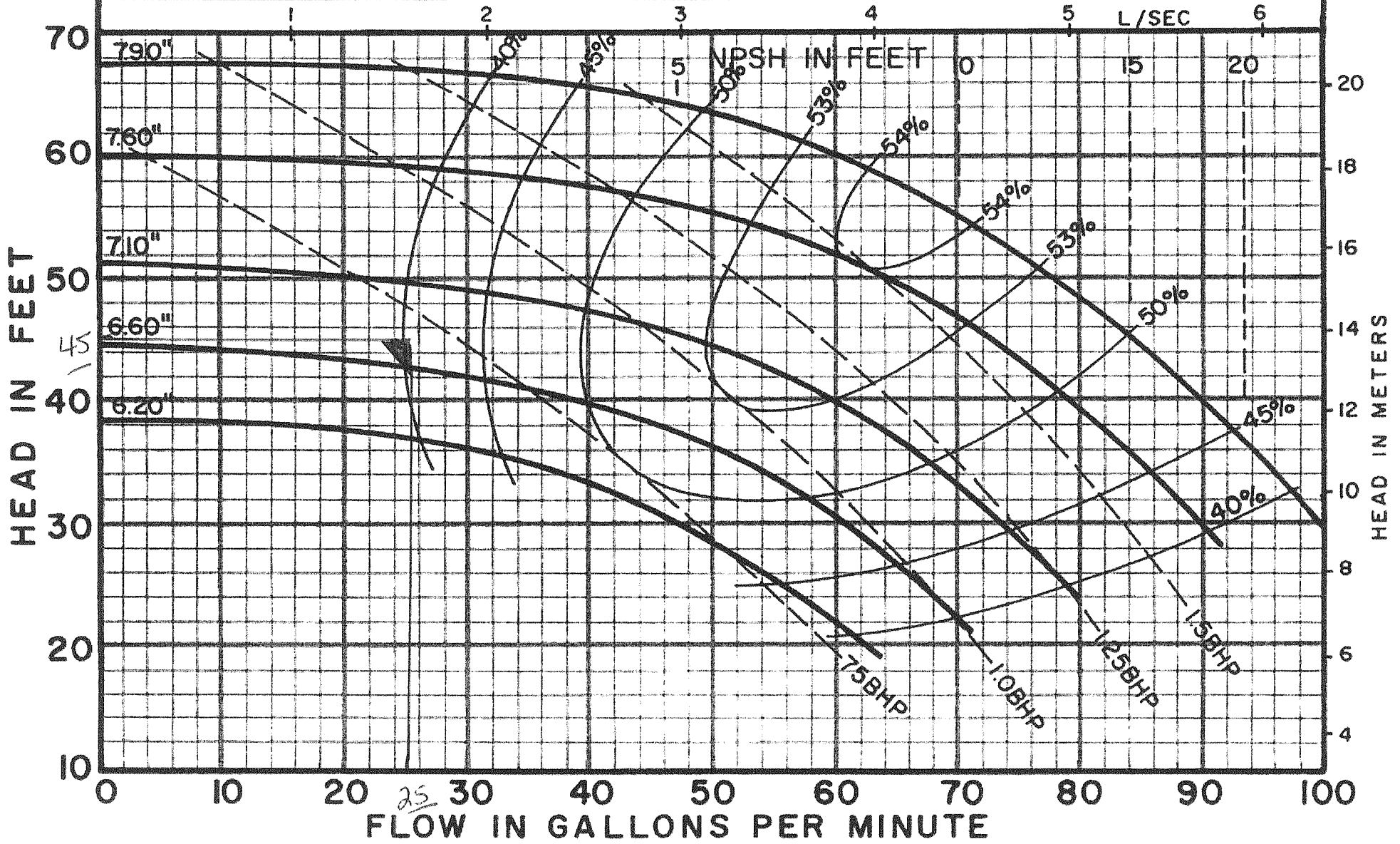
4-P 5 + 6



MODEL 1919
1900 SERIES

1750 RPM

CURVE NO. 876
Min. Imp. Dia. 6.2
Size 2"





Submittal Data Information

1900 Series Pumps

201-244T

MODEL 1919

1750 RPM

JOB: St Cloud VA Medical Center

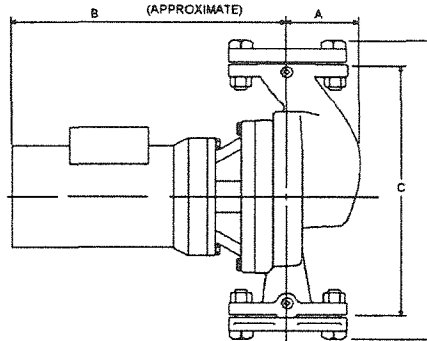
CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

REP: RM Cotton

COMMENTS: Section 232123-2.1B

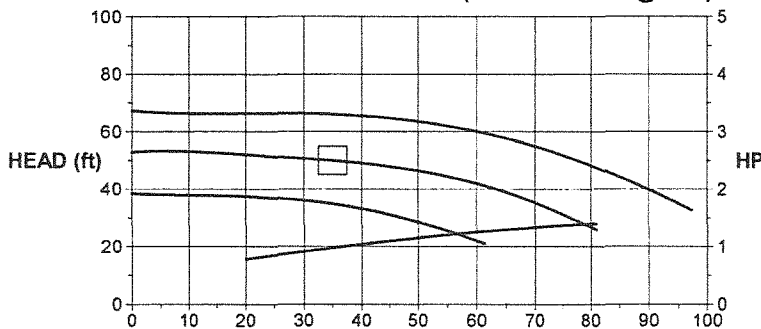
ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
4-P7&8	1919	7.2	35	50	2	460/60/3



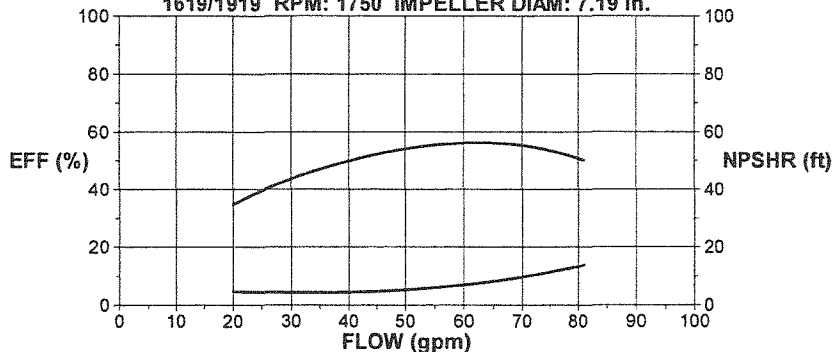
* Dimensions in inches. Do not use for construction purposes unless certified.

Flange Size	HP	A	B	C	D
2	2	3	17-3/4	14-1/2	17-3/8

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



1619/1919 RPM: 1750 IMPELLER DIAM: 7.19 in.



SPECIFICATIONS:

MOTORS

1750 RPM, Three Phase, 208/230/460V, 60Hz, Nema 56 C Frame Motors.
Also available in Single Phase 115/208/230V, 1/4 HP - 1 1/2 HP.
Motors are Nema 56 C Frame, sealed ball bearing design, and require no maintenance.

BODY

Cast Iron with in-line flanged connections. Also available in optional all bronze. Companion flanges available with the pump.

IMPELLER

One Piece Cast Bronze, Closed, Dynamically Balanced Impeller.

DRIVE

Close Coupled Direct Driven Pump.

SHAFT

Alloy Steel with Cupro Nickel Shaft Sleeve.

MECHANICAL SEAL

2 Piece Standard 250F (121C) Max. Operating Temp. Optional 300F (149C) Max. Operating Temp.

WORKING PRESSURE

175 PSI (1207kPa) in accordance with ASA B16.1.
NOTE: Pump flanges are tapped for gauges.

Do it once. Do it right.

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TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436

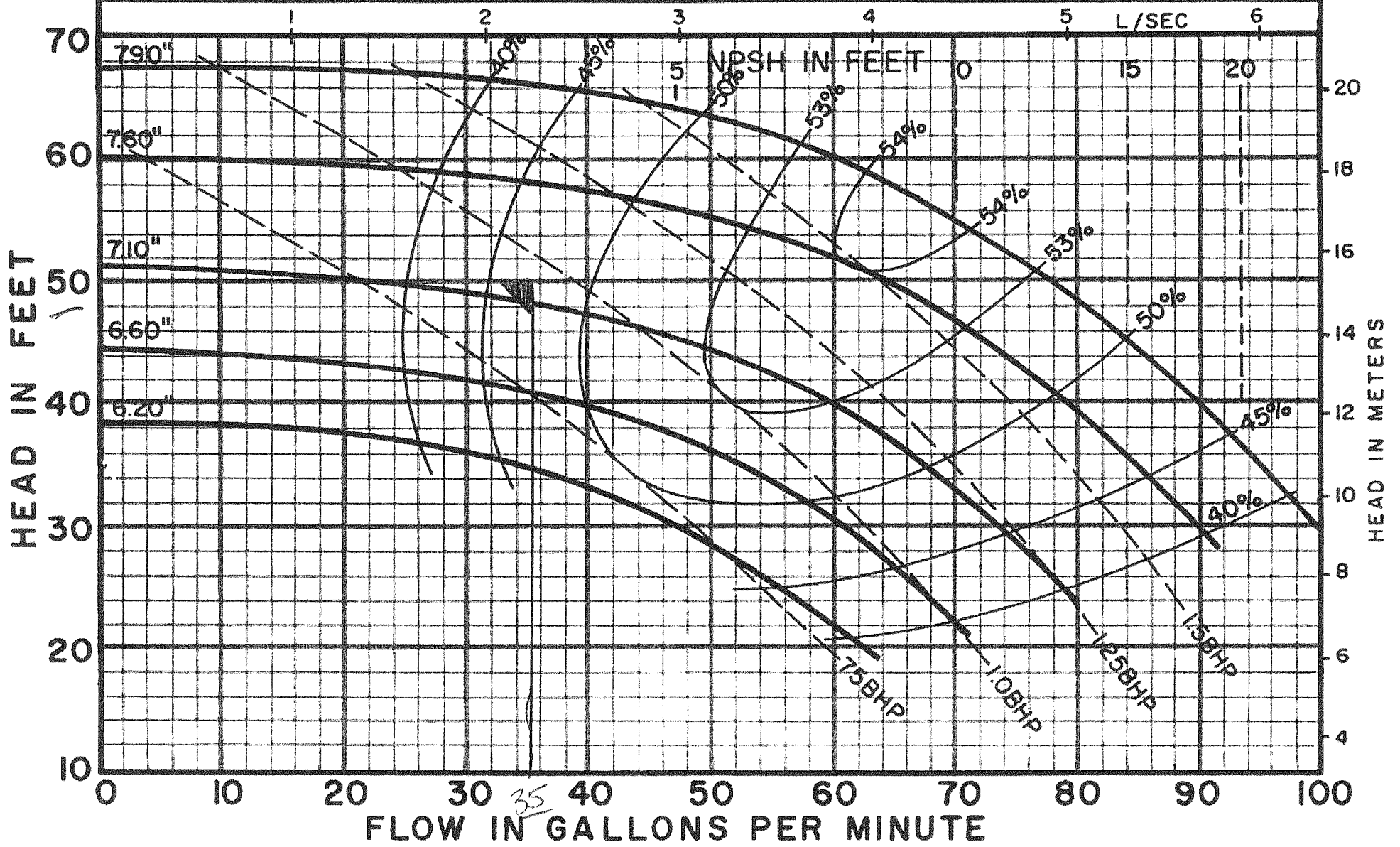
4-P 7+8



MODEL 1919
1900 SERIES

1750 RPM

CURVE NO. 876
Min. Imp. Dia. 6.2
Size 2"





Submittal Data Information

FI Series Pumps

301-1415T

MODEL 3007

1160 RPM

JOB: St Cloud VA Medical Center

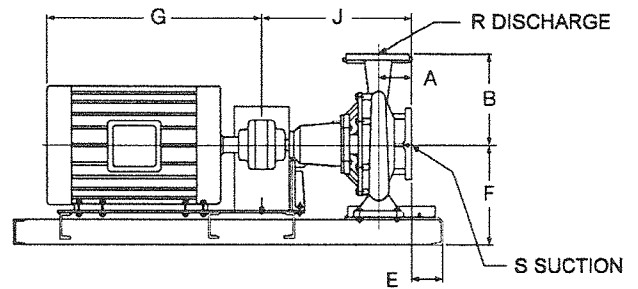
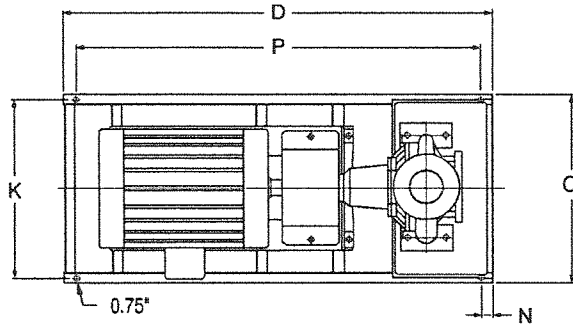
CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

REP: RM Cotton

COMMENTS: Section 232123-2.1C

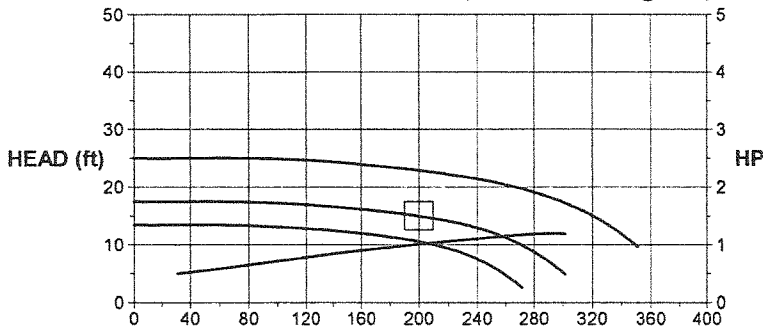
ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
4-P1	F13007	6.3	200	15	2	460/60/3



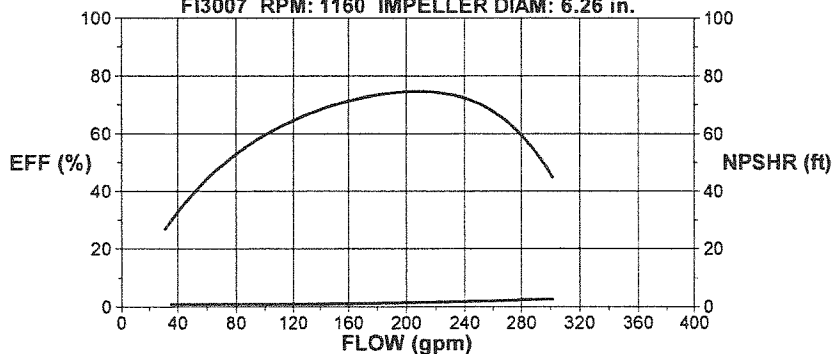
* Dimensions in inches. Do not use for construction purposes unless certified.

HP	FRAME	A	B	C	D	E	F	G	J	K	N	P	R	S
2	184T	4.72	10	16.17	41.5	1.05	11.4	16.56	23.92	14.67	2	37.5	3	4

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



F13007 RPM: 1160 IMPELLER DIAM: 6.26 in.



Item	BRONZE FITTED	
	Std. Pump Constr.	Optional
Casing	Cast Iron ASTM A48 Cl.30A	
Impeller	Bronze ASTM B584-836	
Wear Ring		
Shaft	Carbon Steel AISI 1045	
Shaft Sleeve	Bronze SAE 660	
Mech. Seal	Ceramic	
Seal Flush Line	Copper	

OPERATING SPECIFICATIONS

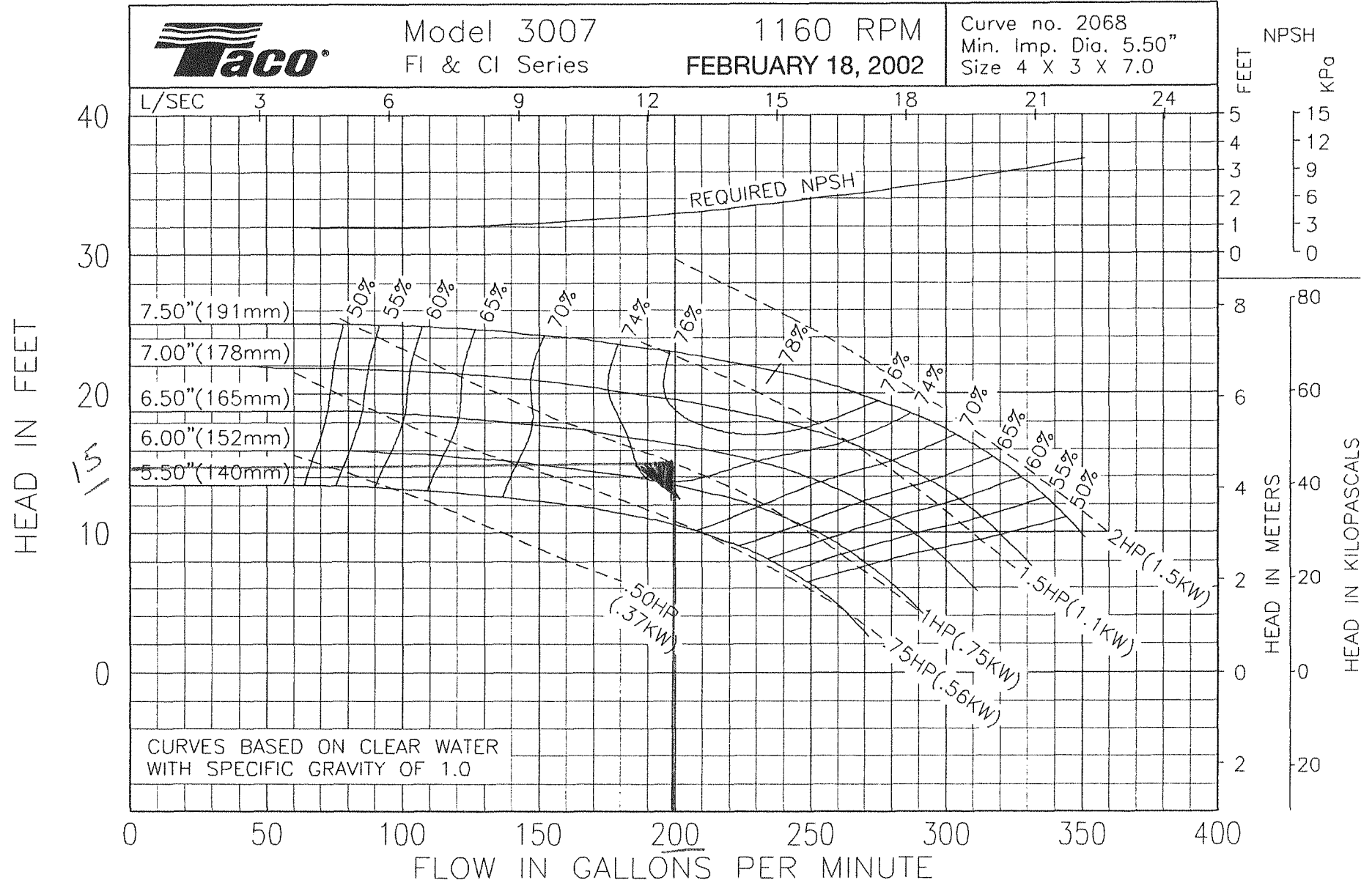
	Standard	Optional
Flange	125#	
Pressure	175 PSIG*	
Temperature	250 F	

Motors: All NEMA Standard (T Frame)
 * In Accordance with ANSI Standard B16.1 Class 125
 ** In Accordance with ANSI Standard B16.1 Class 250 Dim.

Do it once. Do it right.

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 TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436

4-P1





Submittal Data Information

FI Series Pumps

301-1428T

MODEL 3009

1760 RPM

JOB: St Cloud VA Medical Center

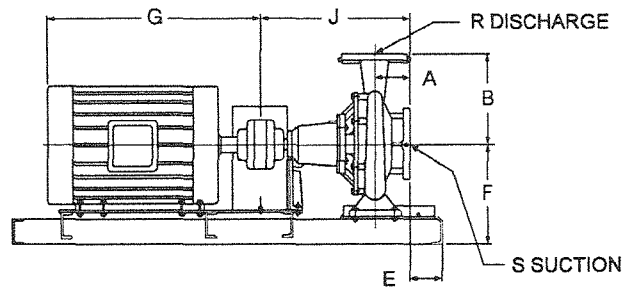
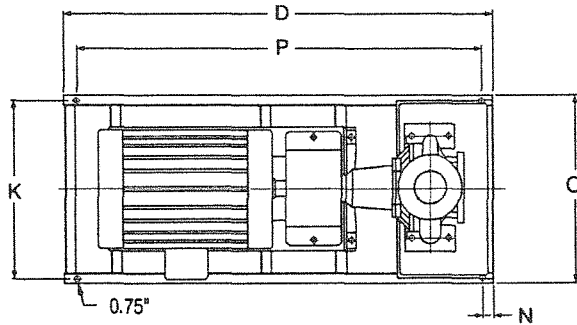
CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

REP: RM Cotton

COMMENTS: Section 232123-2.1C

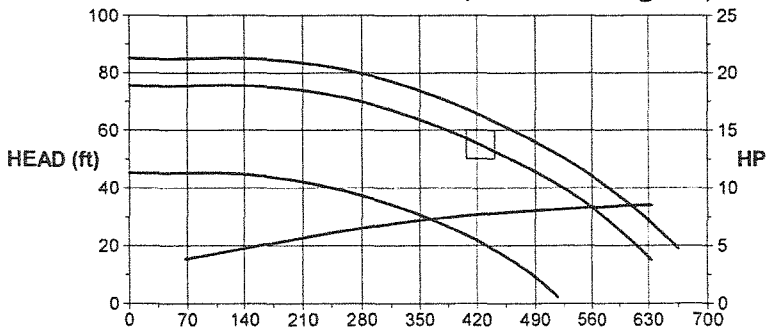
ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
4-P3&4	FI3009	8.7	425	55	10	460/60/3



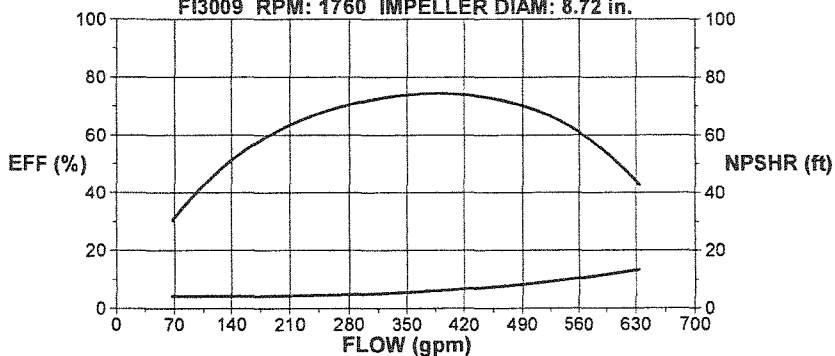
* Dimensions in inches. Do not use for construction purposes unless certified.

HP	FRAME	A	B	C	D	E	F	G	J	K	N	P	R	S
10	215T	4.73	10	16.17	41.5	1.04	11.4	18.19	23.24	14.67	2	37.5	3	4

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



FI3009 RPM: 1760 IMPELLER DIAM: 8.72 in.



Item	BRONZE FITTED	
	Std. Pump Constr.	Optional
Casing	Cast Iron ASTM A48 Cl.30A	
Impeller	Bronze ASTM B584-836	
Wear Ring		
Shaft	Carbon Steel AISI 1045	
Shaft Sleeve	Bronze SAE 660	
Mech. Seal	Ceramic	
Seal Flush Line	Copper	

OPERATING SPECIFICATIONS

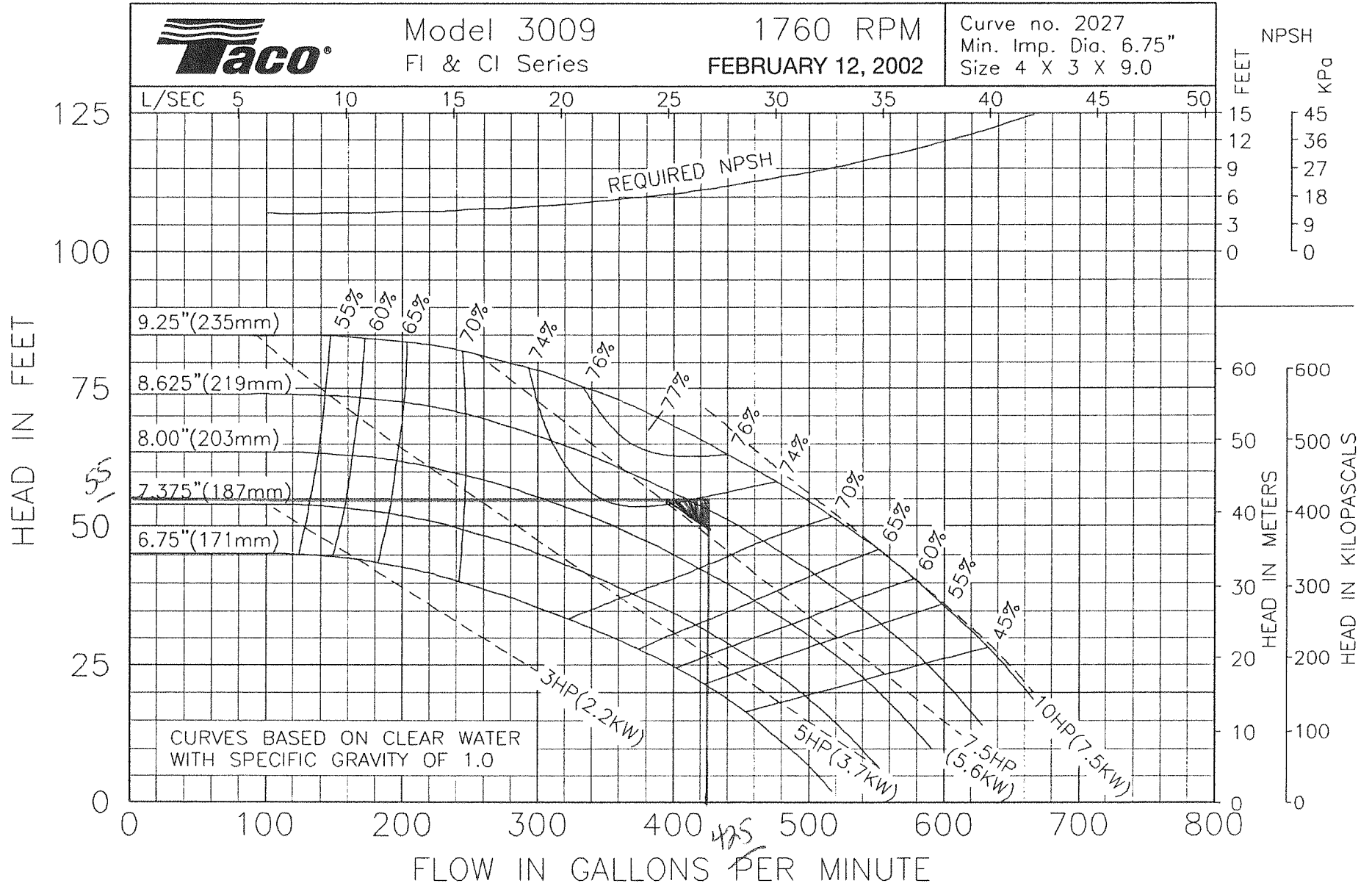
	Standard	Optional
Flange	125#	
Pressure	175 PSIG*	
Temperature	250 F	

Motors: All NEMA Standard (T Frame)
 * In Accordance with ANSI Standard B16.1 Class 125
 ** In Accordance with ANSI Standard B16.1 Class 250 Dim.

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4-P3+4





Submittal Data Information

Suction Diffuser Rear Strainer Pullout (RSP) "Flanged"

301-239

SUPERSEDES: New

EFFECTIVE: February 1, 2006

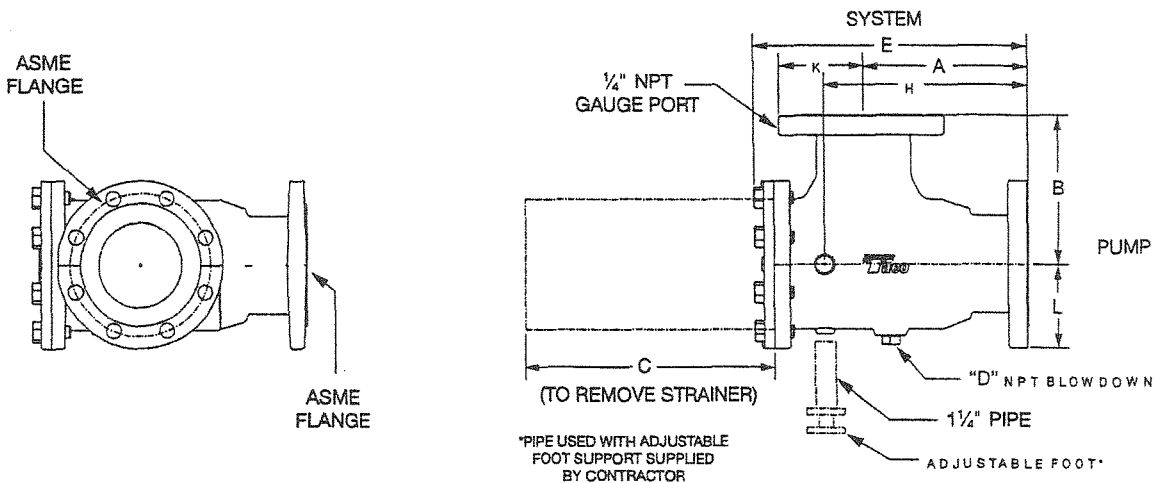
JOB St Cloud VA Med Center ENGINEER _____ CONTRACTOR El Jay Plumbing & Heating REP. R.M. Cotton Co.

ITEM 4-P1	QUANTITY 1	MODEL NO. SD040040-1J	SIZE 4" x 4"
---------------------	----------------------	---------------------------------	------------------------

DIMENSIONS

Model Number	System	Pump	C _v	Free Area (sq. in.)	A (125#)	A (250#)	B	C	D	E	H	K (125#)	K (250#)	L (125#)	L (250#)	WEIGHT (125#)	WEIGHT (250#)
SD020015-4	2 Flanged	1½ Flanged	54	21	5.69 (145)	6.06 (154)	5.39 (137)	8.49 (216)	¾	9.25 (235)	6.92 (176)	3.00 (076)	3.25 (083)	2.50 (064)	3.06 (078)	22 (010)	27 (012)
SD020020-4	2 Flanged	2 Flanged	106	21	5.44 (138)	5.69 (145)	5.39 (137)	8.24 (209)	¾	9.00 (229)	6.67 (169)	3.00 (076)	3.25 (083)	3.00 (076)	3.25 (083)	24 (011)	28 (013)
SD025020-4	2½ Flanged	2 Flanged	98	21												27 (012)	35 (016)
SD030020-4	3 Flanged	2 Flanged	90	21	6.06 (154)	6.56 (167)	6.01 (153)	8.97 (228)	¾	9.25 (235)	7.41 (188)	3.50 (089)	3.75 (095)	3.50 (089)	3.75 (095)	29 (013)	39 (018)
SD025025-4	2½ Flanged	2½ Flanged	135	24												38 (017)	54 (025)
SD030025-4	3 Flanged	2½ Flanged	135	24	6.86 (174)	7.62 (194)	6.56 (167)	10.47 (266)	1	13.96 (355)	10.29 (261)	4.50 (114)	5.00 (127)	3.75 (095)	4.12 (105)	50 (023)	66 (030)
SD030030-4	3 Flanged	3 Flanged	220	35												55 (025)	72 (033)
SD040030-4	4 Flanged	3 Flanged	220	35	7.94 (202)	8.93 (227)	8.45 (215)	12.86 (327)	1	13.96 (355)	10.29 (261)	4.50 (114)	5.00 (127)	4.50 (114)	5.00 (127)	73 (033)	91 (041)
SD040040-4	4 Flanged	4 Flanged	380	64												75 (034)	97 (044)
SD050040-4	5 Flanged	4 Flanged	354	64	10.06 (256)	10.06 (256)	8.94 (227)	15.36 (390)	1	16.54 (420)	12.48 (317)	5.50 (140)	6.25 (159)	5.00 (127)	5.50 (140)	96 (044)	127 (058)
SD060040-4	6 Flanged	4 Flanged	345	64												151 (069)	193 (088)
SD050050-4	5 Flanged	5 Flanged	669	100	11.58 (294)	12.08 (307)	11.17 (284)	19.02 (483)	1	20.39 (518)	16.17 (411)	6.75 (171)	7.50 (191)	5.50 (140)	6.25 (159)	170 (077)	215 (098)
SD060050-4	6 Flanged	5 Flanged	646	100												182 (083)	238 (108)
SD060060-4	6 Flanged	6 Flanged	985	146	14.43 (367)	15.31 (389)	13.21 (336)	23.79 (604)	1	25.32 (643)	20.22 (514)	8.00 (203)	8.75 (222)	6.75 (171)	7.50 (191)	271 (123)	319 (145)
SD080060-4	8 Flanged	6 Flanged	950	146												284 (129)	351 (159)
SD100060-4	10 Flanged	6 Flanged	950	146	18.36 (466)	19.61 (498)	14.54 (369)	29.40 (747)	1	31.10 (790)	25.64 (651)	9.50 (241)	10.25 (260)	8.00 (203)	8.75 (222)	305 (138)	388 (176)
SD080080-4	8 Flanged	8 Flanged	1657	248												400 (182)	482 (219)
SD100080-4	10 Flanged	8 Flanged	1567	248	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	12.75 (324)	9.50 (241)	10.25 (260)	420 (191)	518 (235)
SD120100-4	12 Flanged	10 Flanged	2252	394												589 (267)	703 (319)
SD140100-4	14 Flanged	10 Flanged	2200	394	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	12.75 (324)	9.50 (241)	10.25 (260)	617 (280)	786 (357)
SD120120-4	12 Flanged	12 Flanged	3000	570												651 (295)	802 (364)
SD140120-4	14 Flanged	12 Flanged	3000	570	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	12.75 (324)	9.50 (241)	10.25 (260)	651 (295)	802 (364)
SD160120-4	16 Flanged	12 Flanged	3000	570													

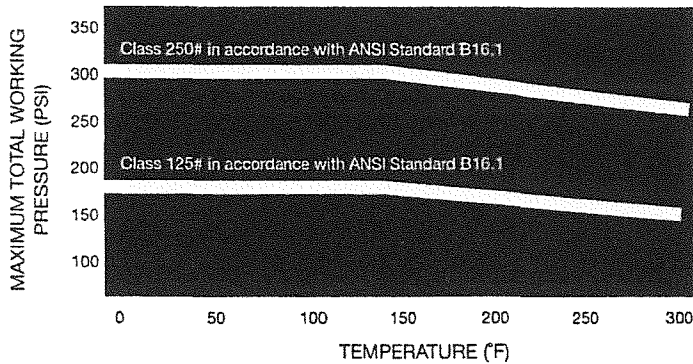
NOTE: Dimensions are in inches. Metric dimensions are in millimeters and are in parentheses (). Weights are in lb (kg).
 'C' is the distance required to replace strainer.
 Append 'A' for 250# working pressure (e.g. Model Number SD040030-4A).



MATERIALS OF CONSTRUCTION

- Body - Ductile Iron
- Cover - Ductile Iron
- Straightening Vanes - Stainless Steel (304)
- Permanent Strainer - Stainless Steel (304)
- Disposable Start Up Strainer - Bronze (16 Mesh)
- Cover O-Ring - EPDM

PRESSURE TEMPERATURE RATINGS

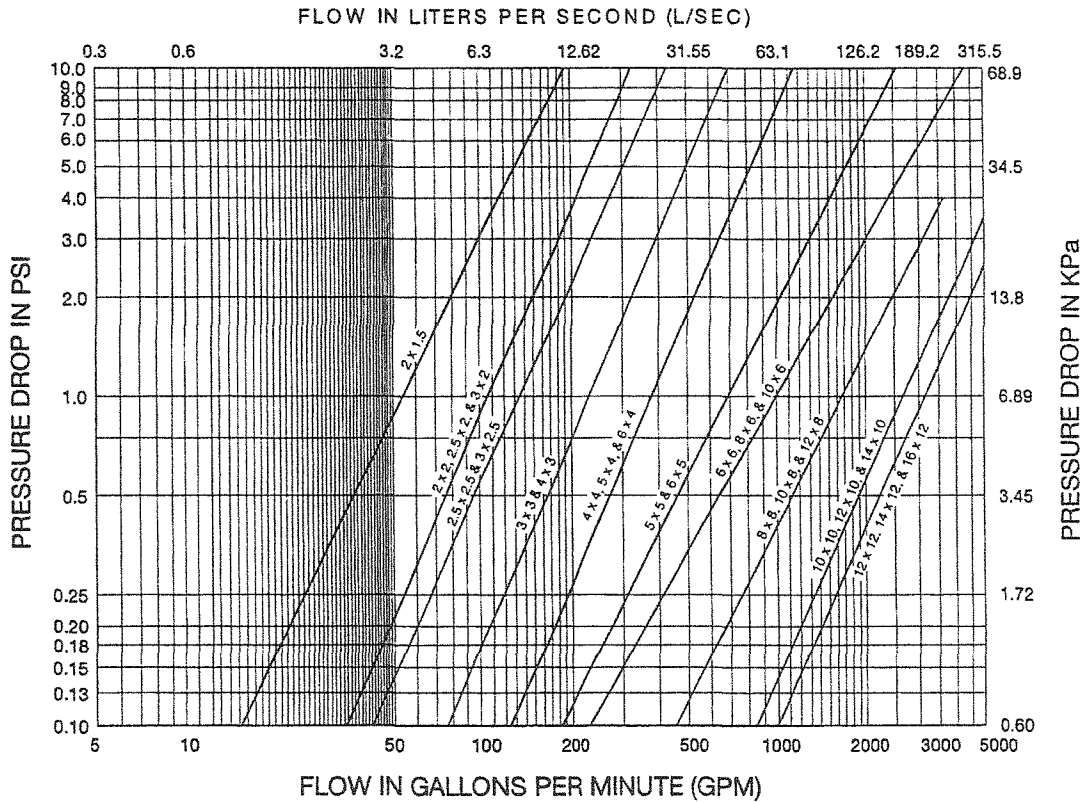


OPERATING SPECIFICATIONS

	Standard	Optional
Flange	Class 125*	Class 250*
Pressure	175 PSIG* (1210 KPA)	300 PSIG* (2070 KPA)
Temperature	250°F (120°C**)	250°F (120°C**)

* Per Pressure Temperature Ratings chart to left.

** For operating temperatures above 250°F, a cooled flush is required and is recommended for temperatures above 225°F for optimum seal life. On closed systems, cooling is accomplished by inserting a small heat exchanger in the flush line to cool the seal flushing fluid.



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Submittal Data Information

Suction Diffuser Rear Strainer Pullout (RSP) "Flanged"

301-239

SUPERSEDES: New

EFFECTIVE: February 1, 2006

JOB Sr Cloud VA Med Center

ENGINEER _____

CONTRACTOR El Jay Plumbing & Heating

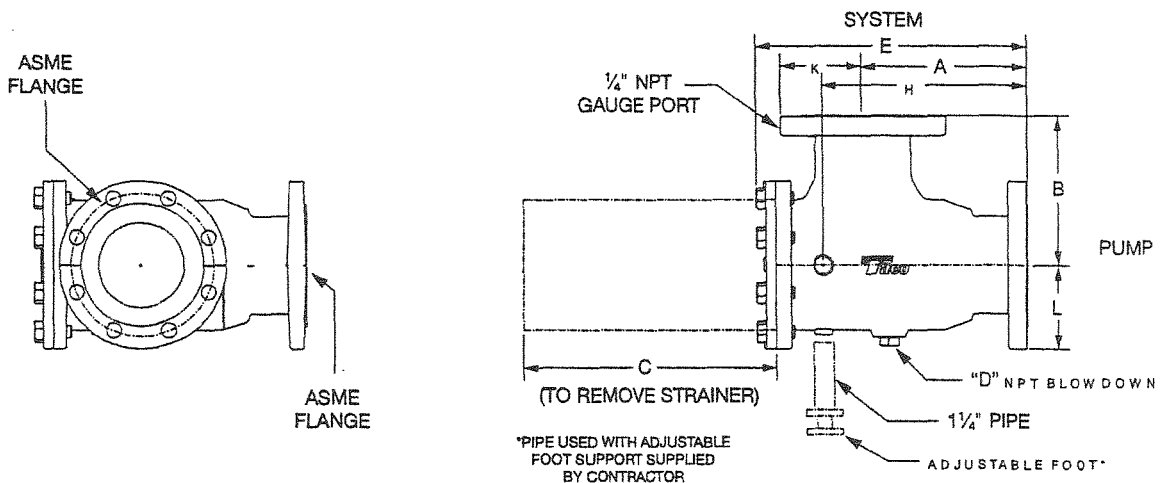
REP. R.M. Cotton Co.

ITEM 4-P3&4	QUANTITY 2	MODEL NO. SD060040-1J	SIZE 6" x 4"
---------------------------	----------------------	---------------------------------	------------------------

DIMENSIONS

Model Number	System	Pump	C _v	Free Area (sq. in.)	A (125#)	A (250#)	B	C	D	E	H	K (125#)	K (250#)	L (125#)	L (250#)	WEIGHT (125#)	WEIGHT (250#)
SD020015-4	2 Flanged	1½ Flanged	54	21	5.69 (145)	6.06 (154)	5.39 (137)	8.49 (216)	¾	9.25 (235)	6.92 (176)	3.00 (076)	3.25 (083)	2.50 (064)	3.06 (078)	22 (010)	27 (012)
SD020020-4	2 Flanged	2 Flanged	106	21	5.44 (138)	5.69 (145)	5.39 (137)	8.24 (209)	¾	9.00 (229)	6.67 (169)	3.00 (076)	3.25 (083)	3.00 (076)	3.25 (083)	24 (011)	28 (013)
SD025020-4	2½ Flanged	2 Flanged	98	21					¾	9.25 (235)	6.67 (169)	3.50 (089)	3.75 (095)	3.00 (076)	3.25 (083)	27 (012)	35 (016)
SD030020-4	3 Flanged	2 Flanged	90	21	6.06 (154)	6.56 (167)	6.01 (153)	8.97 (228)	¾	9.25 (235)	7.41 (188)	3.75 (095)	4.12 (105)	3.00 (076)	3.25 (083)	29 (013)	39 (018)
SD025025-4	2½ Flanged	2½ Flanged	135	24					¾	9.25 (235)	7.41 (188)	3.50 (089)	3.75 (095)	3.50 (089)	3.75 (095)	38 (017)	54 (025)
SD030025-4	3 Flanged	2½ Flanged	135	24	6.86 (174)	7.62 (194)	6.56 (167)	10.47 (266)	1	11.41 (290)	8.32 (211)	3.75 (095)	4.12 (105)	3.75 (095)	4.12 (105)	50 (023)	66 (030)
SD030030-4	3 Flanged	3 Flanged	220	35					1	11.41 (290)	8.32 (211)	4.50 (114)	5.00 (127)	3.75 (095)	4.12 (105)	55 (025)	72 (033)
SD040030-4	4 Flanged	3 Flanged	220	35	7.94 (202)	8.93 (227)	8.45 (215)	12.86 (327)	1	13.96 (355)	10.29 (261)	4.50 (114)	5.00 (127)	4.50 (114)	5.00 (127)	73 (033)	91 (041)
SD040040-4	4 Flanged	4 Flanged	380	64					1	13.96 (355)	10.29 (261)	5.00 (127)	5.50 (140)	4.50 (114)	5.00 (127)	75 (034)	97 (044)
SD050040-4	5 Flanged	4 Flanged	354	64	10.06 (256)	10.06 (256)	8.94 (227)	15.36 (390)	1	16.54 (420)	12.48 (317)	5.50 (140)	6.25 (159)	5.00 (127)	5.50 (140)	90 (041)	116 (053)
SD060040-4	6 Flanged	4 Flanged	345	64					1	16.54 (420)	12.48 (317)	5.50 (140)	6.25 (159)	5.00 (127)	5.50 (140)	96 (044)	127 (058)
SD060050-4	5 Flanged	5 Flanged	669	100	11.58 (294)	12.08 (307)	11.17 (284)	19.02 (483)	1	20.39 (518)	16.17 (411)	5.50 (140)	6.25 (159)	5.50 (140)	6.25 (159)	151 (069)	193 (088)
SD060060-4	6 Flanged	6 Flanged	985	146					1	20.39 (518)	16.17 (411)	6.75 (171)	7.50 (191)	5.50 (140)	6.25 (159)	170 (077)	215 (098)
SD080060-4	8 Flanged	6 Flanged	950	146	14.43 (367)	15.31 (389)	13.21 (336)	23.79 (604)	1	25.32 (643)	20.22 (514)	6.75 (171)	7.50 (191)	6.75 (171)	7.50 (191)	271 (123)	319 (145)
SD100060-4	10 Flanged	8 Flanged	1567	248					1	25.32 (643)	20.22 (514)	8.00 (203)	8.75 (222)	6.75 (171)	7.50 (191)	284 (129)	351 (159)
SD120080-4	12 Flanged	8 Flanged	1542	248	18.36 (466)	19.61 (498)	14.54 (369)	29.40 (747)	1	31.10 (790)	25.64 (651)	8.00 (203)	8.75 (222)	8.00 (203)	8.75 (222)	400 (182)	482 (219)
SD100100-4	10 Flanged	10 Flanged	2650	394					1	31.10 (790)	25.64 (651)	8.50 (214)	10.25 (260)	6.75 (171)	7.50 (191)	305 (138)	388 (176)
SD120100-4	12 Flanged	10 Flanged	2252	394	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	8.00 (203)	8.75 (222)	8.00 (203)	8.75 (222)	441 (200)	557 (253)
SD140100-4	14 Flanged	10 Flanged	2200	394					1	35.50 (902)	29.83 (758)	8.50 (214)	10.25 (260)	8.00 (203)	8.75 (222)	441 (200)	557 (253)
SD120120-4	12 Flanged	12 Flanged	3000	570	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	9.50 (241)	10.25 (260)	9.50 (241)	10.25 (260)	589 (267)	703 (319)
SD140120-4	14 Flanged	12 Flanged	3000	570					1	35.50 (902)	29.83 (758)	9.50 (241)	10.25 (260)	9.50 (241)	10.25 (260)	617 (280)	786 (357)
SD160120-4	16 Flanged	12 Flanged	3000	570	11.75 (298)	12.75 (324)	9.50 (241)	10.25 (260)	1	11.75 (298)	12.75 (324)	9.50 (241)	10.25 (260)	9.50 (241)	10.25 (260)	651 (296)	802 (364)

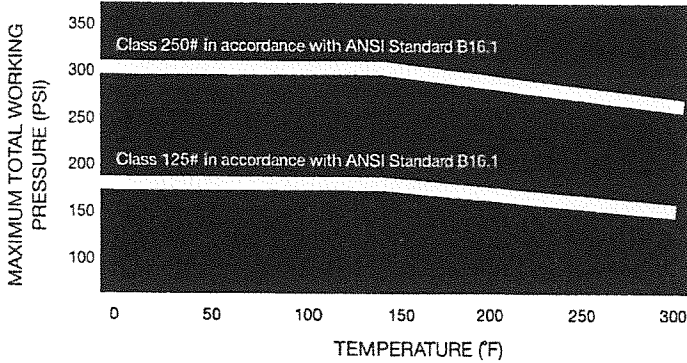
NOTE: Dimensions are in inches. Metric dimensions are in millimeters and are in parentheses (). Weights are in lb (kg).
 "C" is the distance required to replace strainer.
 Append "A" for 250# working pressure (e.g. Model Number SD040030-4A).



MATERIALS OF CONSTRUCTION

- Body - Ductile Iron
- Cover - Ductile Iron
- Straightening Vanes - Stainless Steel (304)
- Permanent Strainer - Stainless Steel (304)
- Disposable Start Up Strainer - Bronze (16 Mesh)
- Cover O-Ring - EPDM

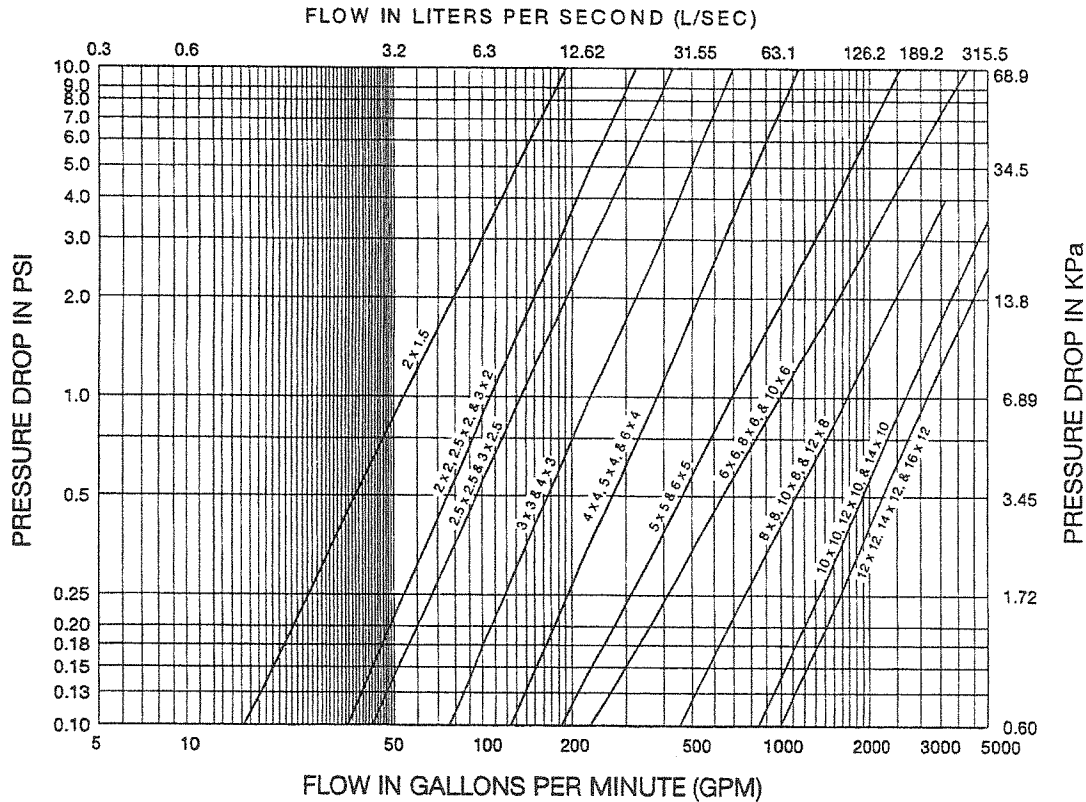
PRESSURE TEMPERATURE RATINGS



OPERATING SPECIFICATIONS

	Standard	Optional
Flange	Class 125*	Class 250*
Pressure	175 PSIG* (1210 KPA)	300 PSIG* (2070 KPA)
Temperature	250°F (120°C**)	250°F (120°C**)

* Per Pressure Temperature Ratings chart to left.
 ** For operating temperatures above 250°F, a cooled flush is required and is recommended for temperatures above 225°F for optimum seal life. On closed systems, cooling is accomplished by inserting a small heat exchanger in the flush line to cool the seal flushing fluid.



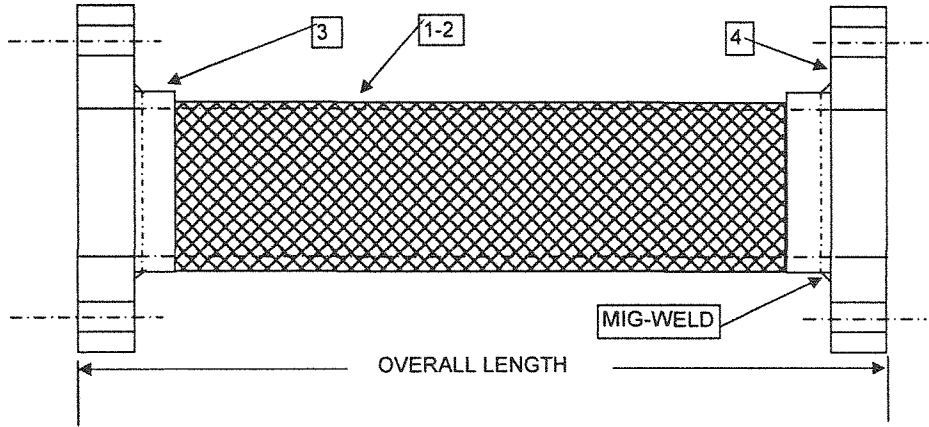
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TCHS-FLG



MATERIALS:

#1-2 HOSE: STAINLESS STEEL HOSE WITH 1 LAYER OF STAINLESS BRAID

#3 BRAID COLLAR: T-304 STAINLESS STEEL

#4 FLANGES: CARBON STEEL PLATE FLANGES 150# DRILL

QTY	MODEL NUMBER	SIZE	OVERALL LENGTH	MAX O.D.	WRK. PSIG	@ TEMP	MAX TEST	LATERAL OFFSET
	TCHS-150-FLG	1.5"	9"	5.5"	410	70° F	615	1/16"
	TCHS-200-FLG	2"	9"	6"	450	70° F	675	1/16"
	TCHS-250-FLG	2.5"	9"	7"	570	70° F	855	1/16"
	TCHS-300-FLG	3"	9"	7.5"	450	70° F	675	1/16"
1	TCHS-400-FLG	4"	14"	9"	285	70° F	428	1/16"
	TCHS-500-FLG	5"	11"	10"	210	70° F	315	1/16"
	TCHS-600-FLG	6"	11"	11"	240	70° F	360	1/16"
	TCHS-800-FLG	8"	12"	13.5"	217	70° F	326	1/16"
	TCHS-1000-FLG	10"	13"	16"	165	70° F	248	1/16"
	TCHS-1200-FLG	12"	14"	19"	155	70° F	233	1/16"
	TCHS-1400-FLG	14"	14"	21"	125	70° F	188	1/16"
	TCHS-1600-FLG	16"	14"	23.5"	110	70° F	165	1/16"

TEMPERATURE DERATING FACTORS: MULTIPLY X WRK. PSIG

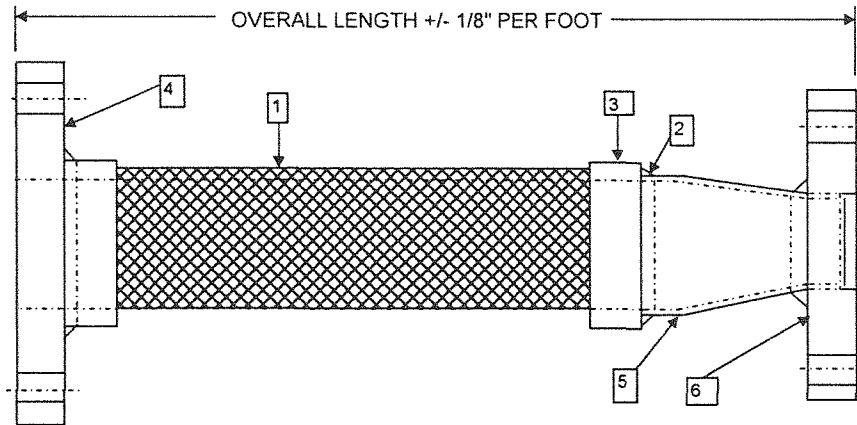
200° F	250° F	300° F	350° F	400° F	500° F	600° F	700° F
0.94	0.92	0.88	0.86	0.83	0.78	0.74	0.7

CUSTOMER: Tag - 4 - PI
 PROJECT: St Cloud VA Medical Center
 ENGINEER:
 PO#:

TWIN CITY HOSE, INC 20615 COMMERCE BLVD. ROGERS, MN 55374

Phone 800-670-9475 Fax 763-428-5111 www.twincityhose.com

RCFF



MATERIALS:

#1 HOSE & BRAID: T-321 STAINLESS STEEL HOSE & 1 LAYER STAINLESS STEEL BRAID

#2 #3 BRAID COLLAR: STAINLESS STEEL HELI-ARC WELD/ MIG WELD
STAINLESS STEEL BRAID COLLAR

#4 #6 FITTINGS: 150# CARBON STEEL PLATE FLANGE-FLAT FACE
150# CARBON STEEL PLATE FLANGE-FLAT FACE REDUCED END

#5 REDUCER: SCH 40 CARBON STEEL CONCENTRIC WELD REDUCER

QTY	MODEL NUMBER	DESCRIPTION	WRK PSI	@ TEMP	LATERAL OFFSET	LARGE END SIZE	SMALL END SIZE
	RCFF1210	12"X10"X20" OAL REDUCER	155	70° F	3/16"	12"	10"
	RCFF1008	10"X8"X18" OAL REDUCER	165	70° F	3/16"	10"	8"
	RCFF1006	10"X6"X18" OAL REDUCER	165	70° F	3/16"	10"	6"
	RCFF0806	8"X6"X18" OAL REDUCER	217	70° F	1/4"	8"	6"
	RCFF0805	8"X5"X18" OAL REDUCER	217	70° F	1/4"	8"	5"
	RCFF0804	8"X4"X18" OAL REDUCER	217	70° F	1/4"	8"	4"
	RCFF0605	6"X5"X17" OAL REDUCER	240	70° F	3/8"	6"	5"
	RCFF0604	6"X4"X17" OAL REDUCER	240	70° F	3/8"	6"	4"
	RCFF0603	6"X3"X17" OAL REDUCER	240	70° F	3/8"	6"	3"
	RCFF0504	5"X4"X16" OAL REDUCER	210	70° F	3/8"	5"	4"
	RCFF0503	5"X3"X16" OAL REDUCER	210	70° F	3/8"	5"	3"
	RCFF0525	5"X2-1/2"X16" OAL REDUCER	210	70° F	3/8"	5"	2-1/2"
	RCFF0403	4"X3"X13" OAL REDUCER	285	70° F	3/8"	4"	3"
	RCFF0425	4"X2-1/2"X13" OAL REDUCER	285	70° F	3/8"	4"	2-1/2"
	RCFF0402	4"X2"X13" OAL REDUCER	285	70° F	3/8"	4"	2"
	RCFF0325	3"X2-1/2"X13" OAL REDUCER	450	70° F	3/8"	3"	2-1/2"
	RCFF0302	3"X2"X13" OAL REDUCER	450	70° F	3/8"	3"	2"
	RCFF0315	3"X1-1/2"X13" OAL REDUCER	450	70° F	3/8"	3"	1-1/2"
	RCFF2502	2-1/2"X2"X13" OAL REDUCER	570	70° F	3/8"	2-1/2"	2"
	RCFF2515	2-1/2"X1-1/2"X13" OAL REDUCER	570	70° F	3/8"	2-1/2"	1-1/2"

TEMPERATURE DERATING FACTORS: MULTIPLY X WRK PSIG

200° F	250° F	300° F	350° F	400° F	500° F	600° F	700° F
0.94	0.92	0.88	0.86	0.83	0.78	0.74	0.7

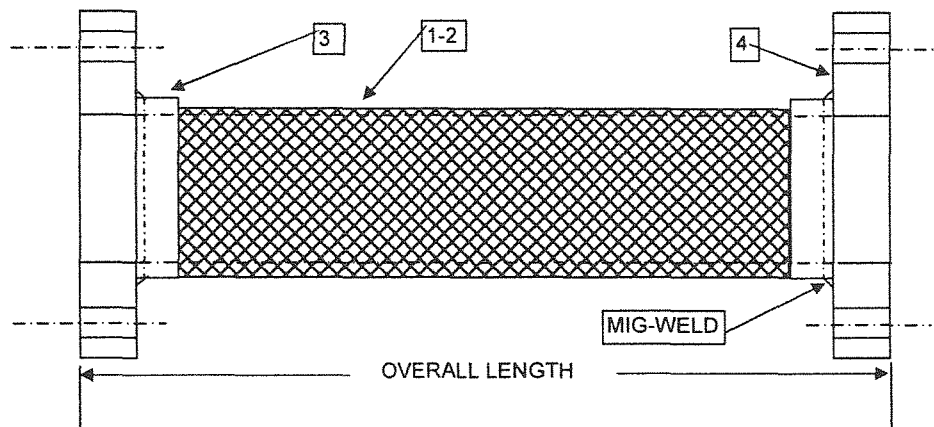
CUSTOMER:	Tag - 4-PI
PROJECT:	St Cloud VA medical Center
ENGINEER:	
PO#:	

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Phone 800-670-9475 Fax 763-428-5111 www.twincityhose.com



TCHS-FLG



MATERIALS:

#1-2 HOSE: STAINLESS STEEL HOSE WITH 1 LAYER OF STAINLESS BRAID

#3 BRAID COLLAR: T-304 STAINLESS STEEL

#4 FLANGES: CARBON STEEL PLATE FLANGES 150# DRILL

QTY	MODEL NUMBER	SIZE	OVERALL LENGTH	MAX O.D.	WRK. PSIG	@ TEMP	MAX TEST	LATERAL OFFSET
	TCHS-150-FLG	1.5"	9"	5.5"	410	70° F	615	1/16"
	TCHS-200-FLG	2"	9"	6"	450	70° F	675	1/16"
	TCHS-250-FLG	2.5"	9"	7"	570	70° F	855	1/16"
	TCHS-300-FLG	3"	9"	7.5"	450	70° F	675	1/16"
	TCHS-400-FLG	4"	9"	9"	285	70° F	428	1/16"
	TCHS-500-FLG	5"	11"	10"	210	70° F	315	1/16"
2	TCHS-600-FLG	6"	11"	11"	240	70° F	360	1/16"
	TCHS-800-FLG	8"	12"	13.5"	217	70° F	326	1/16"
	TCHS-1000-FLG	10"	13"	16"	165	70° F	248	1/16"
	TCHS-1200-FLG	12"	14"	19"	155	70° F	233	1/16"
	TCHS-1400-FLG	14"	14"	21"	125	70° F	188	1/16"
	TCHS-1600-FLG	16"	14"	23.5"	110	70° F	165	1/16"

TEMPERATURE DERATING FACTORS: MULTIPLY X WRK. PSIG

200° F	250° F	300° F	350° F	400° F	500° F	600° F	700° F
0.94	0.92	0.88	0.86	0.83	0.78	0.74	0.7

CUSTOMER: *Tag- 4 - P3 & 4*

PROJECT: St Cloud VA Medical Center

ENGINEER:

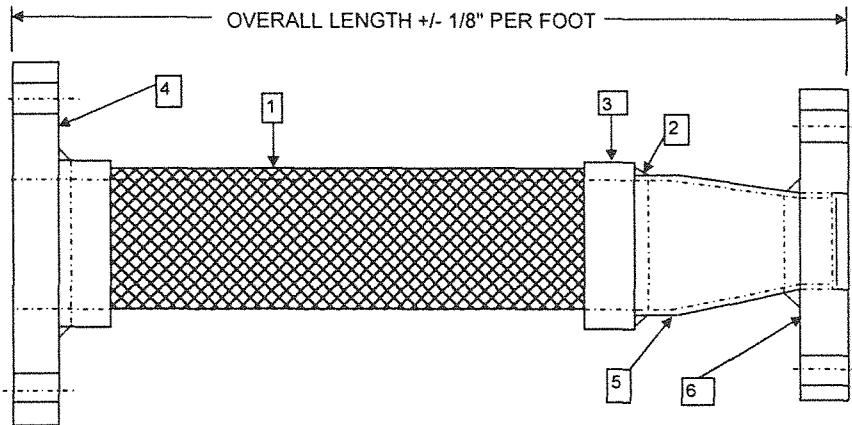
PO#:

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RCFF



MATERIALS:

#1 HOSE & BRAID: T-321 STAINLESS STEEL HOSE & 1 LAYER STAINLESS STEEL BRAID

#2 #3 BRAID COLLAR: STAINLESS STEEL HELI-ARC WELD/ MIG WELD
STAINLESS STEEL BRAID COLLAR

#4 #6 FITTINGS: 150# CARBON STEEL PLATE FLANGE-FLAT FACE
150# CARBON STEEL PLATE FLANGE-FLAT FACE REDUCED END

#5 REDUCER: SCH 40 CARBON STEEL CONCENTRIC WELD REDUCER

QTY	MODEL NUMBER	DESCRIPTION	WRK PSI	@ TEMP	LATERAL OFFSET	LARGE END SIZE	SMALL END SIZE
	RCFF1210	12"X10"X20" OAL REDUCER	155	70° F	3/16"	12"	10"
	RCFF1008	10"X8"X18" OAL REDUCER	165	70° F	3/16"	10"	8"
	RCFF1006	10"X6"X18" OAL REDUCER	165	70° F	3/16"	10"	6"
	RCFF0806	8"X6"X18" OAL REDUCER	217	70° F	1/4"	8"	6"
	RCFF0805	8"X5"X18" OAL REDUCER	217	70° F	1/4"	8"	5"
	RCFF0804	8"X4"X18" OAL REDUCER	217	70° F	1/4"	8"	4"
	RCFF0605	6"X5"X17" OAL REDUCER	240	70° F	3/8"	6"	5"
	RCFF0604	6"X4"X17" OAL REDUCER	240	70° F	3/8"	6"	4"
2	RCFF0603	6"X3"X17" OAL REDUCER	240	70° F	3/8"	6"	3"
	RCFF0504	5"X4"X16" OAL REDUCER	210	70° F	3/8"	5"	4"
	RCFF0503	5"X3"X16" OAL REDUCER	210	70° F	3/8"	5"	3"
	RCFF0525	5"X2-1/2"X16" OAL REDUCER	210	70° F	3/8"	5"	2-1/2"
	RCFF0403	4"X3"X13" OAL REDUCER	285	70° F	3/8"	4"	3"
	RCFF0425	4"X2-1/2"X13" OAL REDUCER	285	70° F	3/8"	4"	2-1/2"
	RCFF0402	4"X2"X13" OAL REDUCER	285	70° F	3/8"	4"	2"
	RCFF0325	3"X2-1/2"X13" OAL REDUCER	450	70° F	3/8"	3"	2-1/2"
	RCFF0302	3"X2"X13" OAL REDUCER	450	70° F	3/8"	3"	2"
	RCFF0315	3"X1-1/2"X13" OAL REDUCER	450	70° F	3/8"	3"	1-1/2"
	RCFF2502	2-1/2"X2"X13" OAL REDUCER	570	70° F	3/8"	2-1/2"	2"
	RCFF2515	2-1/2"X1-1/2"X13" OAL REDUCER	570	70° F	3/8"	2-1/2"	1-1/2"

TEMPERATURE DERATING FACTORS: MULTIPLY X WRK PSIG

200° F	250° F	300° F	350° F	400° F	500° F	600° F	700° F
0.94	0.92	0.88	0.86	0.83	0.78	0.74	0.7

CUSTOMER: Tag - 4 - P3+4

PROJECT: St Cloud VA Medical Center

ENGINEER:

PO#:

TWIN CITY HOSE, INC 20615 COMMERCE BLVD. ROGERS, MN 55374

Phone 800-670-9475 Fax 763-428-5111 www.twincityhose.com



Submittal Data Information

FI Series Pumps

301-1415T

MODEL 3007

1160 RPM

JOB: St Cloud VA Medical Center

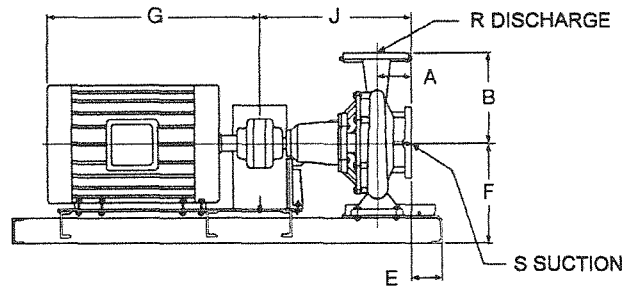
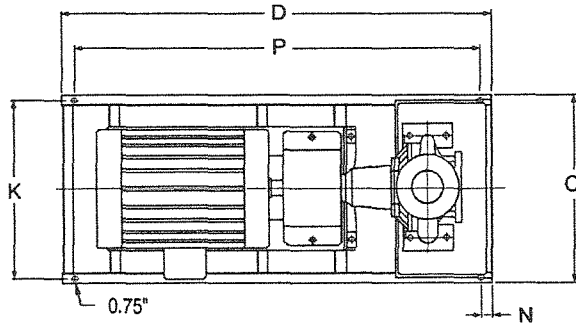
CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

REP: RM Cotton

COMMENTS: Section 232123-2.1C

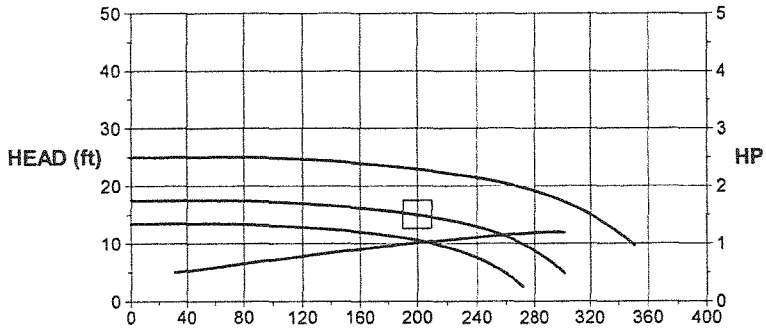
ITEM NO.	MODEL NO.	IMP. DIAM. / IN.	FLOW / GPM	HEAD / FT	POWER / HP	ELEC. CHARS
4-P2	FI3007	6.3	200	15	2	460/60/3



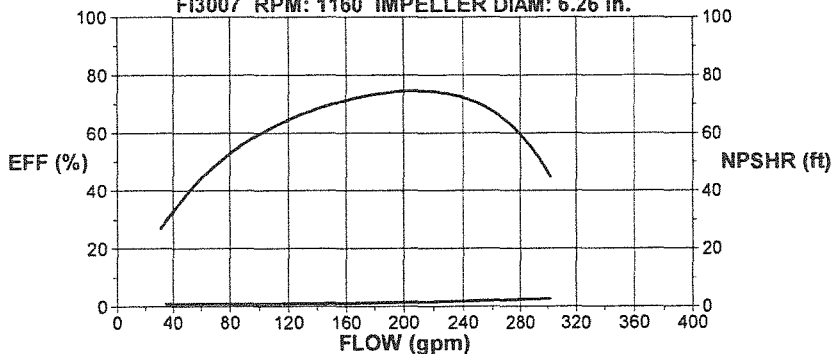
* Dimensions in inches. Do not use for construction purposes unless certified.

HP	FRAME	A	B	C	D	E	F	G	J	K	N	P	R	S
2	184T	4.72	10	16.17	41.5	1.05	11.4	16.56	23.92	14.67	2	37.5	3	4

PUMP PERFORMANCE CURVES (based on Water @ 60 F)



FI3007 RPM: 1160 IMPELLER DIAM: 6.26 in.



Item	BRONZE FITTED	
	Std. Pump Constr.	Optional
Casing	Cast Iron ASTM A48 Cl.30A	
Impeller	Bronze ASTM B584-836	
Wear Ring		
Shaft	Carbon Steel AISI 1045	
Shaft Sleeve	Bronze SAE 660	
Mech. Seal	Ceramic	
Seal Flush Line	Copper	

OPERATING SPECIFICATIONS

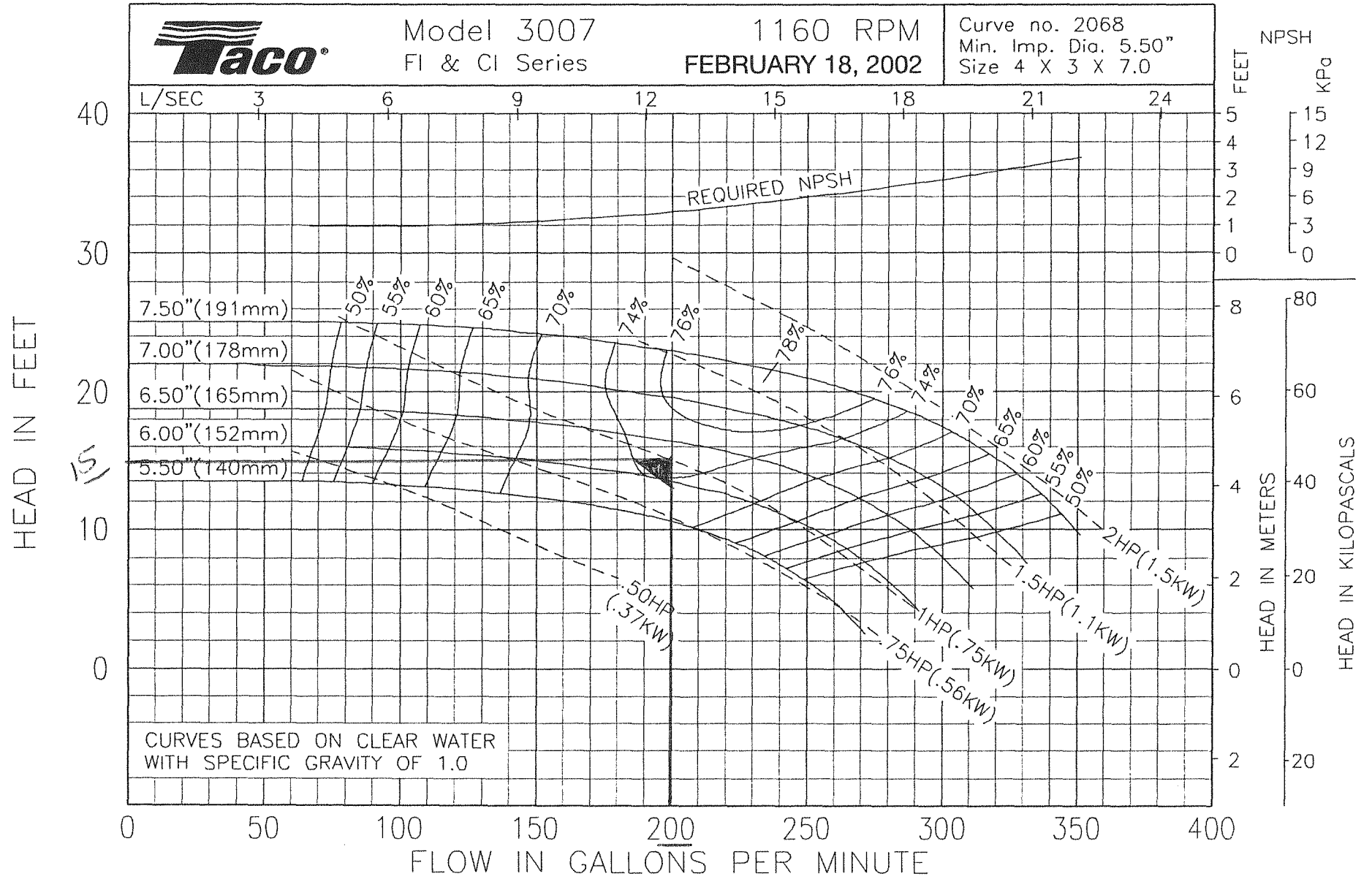
	Standard	Optional
Flange	125#	
Pressure	175 PSIG*	
Temperature	250 F	

Motors: All NEMA Standard (T Frame)
 * In Accordance with ANSI Standard B16.1 Class 125
 ** In Accordance with ANSI Standard B16.1 Class 250 Dim.

Do it once. Do it right.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401)942-8000 FAX: (401)942-2360.
 TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436

4-P2





Submittal Data Information

Suction Diffuser Rear Strainer Pullout (RSP) "Flanged"

301-239

SUPERSEDES: New

EFFECTIVE: February 1, 2006

JOB St Cloud VA Medical Center

ENGINEER _____

CONTRACTOR El Jay P & H

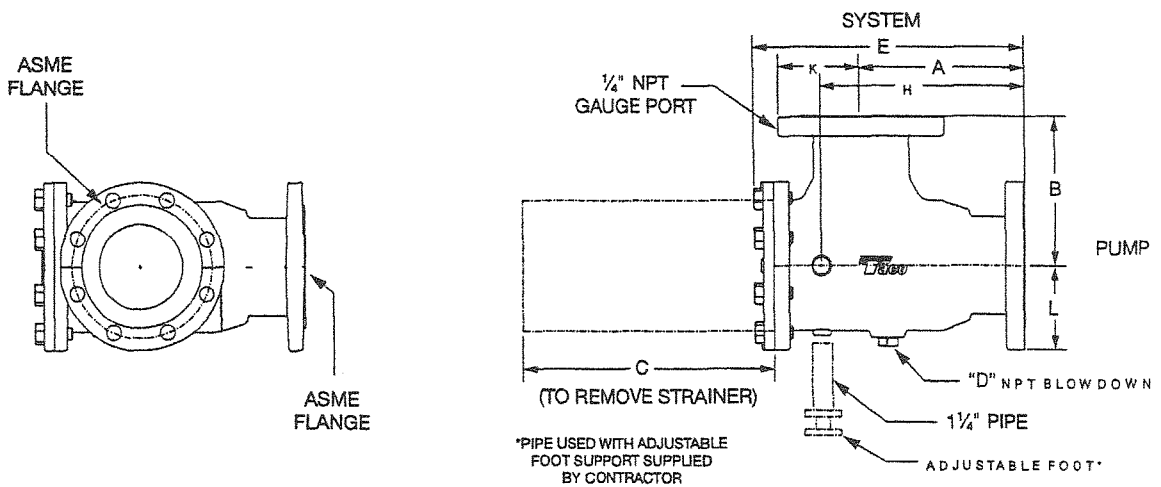
REP. R.M. Cotton Co.

ITEM 4-P2	QUANTITY 1	MODEL NO. SD040040-1J	SIZE 4" x 4"
---------------------	----------------------	---------------------------------	------------------------

DIMENSIONS

Model Number	System	Pump	C _v	Free Area (sq. in.)	A (125#)	A (250#)	B	C	D	E	H	K (125#)	K (250#)	L (125#)	L (250#)	WEIGHT (125#)	WEIGHT (250#)
SD020015-4	2 Flanged	1½ Flanged	54	21	5.69 (145)	6.06 (154)	5.39 (137)	8.48 (216)	¾	9.25 (235)	6.92 (176)	3.00 (076)	3.25 (083)	2.50 (064)	3.06 (078)	22 (010)	27 (012)
SD020020-4	2 Flanged	2 Flanged	106	21	5.44 (138)	5.69 (145)	5.39 (137)	8.24 (209)	¾	9.00 (229)	6.67 (169)	3.00 (076)	3.25 (083)	3.00 (076)	3.25 (083)	24 (011)	28 (013)
SD025020-4	2½ Flanged	2 Flanged	98	21					¾								
SD030020-4	3 Flanged	2 Flanged	90	21	6.06 (154)	6.56 (167)	6.01 (153)	8.97 (228)	¾	9.25 (235)	7.41 (188)	3.50 (089)	3.75 (095)	3.50 (089)	3.75 (095)	38 (017)	54 (025)
SD025025-4	2½ Flanged	2½ Flanged	135	24					¾								
SD030025-4	3 Flanged	2½ Flanged	135	24	6.86 (174)	7.62 (194)	6.56 (167)	10.47 (266)	1	11.41 (290)	8.32 (211)	4.50 (114)	5.00 (127)	3.75 (095)	4.12 (105)	50 (023)	66 (030)
SD030030-4	3 Flanged	3 Flanged	220	35					1								
SD040030-4	4 Flanged	3 Flanged	220	35	7.94 (202)	8.93 (227)	8.45 (215)	12.86 (327)	1	13.96 (355)	10.29 (261)	5.00 (127)	5.50 (140)	4.50 (114)	5.00 (127)	75 (034)	97 (044)
SD040040-4	4 Flanged	4 Flanged	380	64					1								
SD050040-4	5 Flanged	4 Flanged	354	64	10.06 (256)	10.06 (256)	8.94 (227)	15.36 (390)	1	16.54 (420)	12.48 (317)	5.00 (127)	5.50 (140)	5.00 (127)	5.50 (140)	90 (041)	116 (053)
SD060040-4	6 Flanged	4 Flanged	345	64					1								
SD060050-4	5 Flanged	5 Flanged	669	100	11.58 (294)	12.08 (307)	11.17 (284)	19.02 (483)	1	20.39 (518)	16.17 (411)	6.75 (171)	7.50 (191)	5.50 (140)	6.25 (159)	170 (077)	215 (098)
SD060060-4	6 Flanged	6 Flanged	985	146					1								
SD080060-4	8 Flanged	6 Flanged	950	146	14.43 (367)	15.31 (389)	13.21 (336)	23.79 (604)	1	25.32 (643)	20.22 (514)	8.00 (203)	8.75 (222)	6.75 (171)	7.50 (191)	271 (123)	319 (145)
SD100060-4	10 Flanged	6 Flanged	950	146					1								
SD080080-4	8 Flanged	8 Flanged	1657	248	18.36 (466)	19.61 (498)	14.54 (369)	29.40 (747)	1	31.10 (790)	25.64 (651)	9.50 (241)	10.25 (260)	8.00 (203)	8.75 (222)	420 (191)	518 (235)
SD100080-4	10 Flanged	8 Flanged	1567	248					1								
SD120080-4	12 Flanged	8 Flanged	1542	248	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	11.50 (292)	9.50 (241)	10.25 (260)	617 (280)	786 (357)
SD100100-4	10 Flanged	10 Flanged	2650	394					1								
SD120100-4	12 Flanged	10 Flanged	2252	394	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	11.50 (292)	9.50 (241)	10.25 (260)	651 (296)	802 (364)
SD140100-4	14 Flanged	10 Flanged	2200	394					1								
SD120120-4	12 Flanged	12 Flanged	3000	570	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	11.50 (292)	9.50 (241)	10.25 (260)	617 (280)	786 (357)
SD140120-4	14 Flanged	12 Flanged	3000	570					1								
SD160120-4	16 Flanged	12 Flanged	3000	570	20.39 (518)	22.64 (575)	16.62 (422)	33.72 (856)	1	35.50 (902)	29.83 (758)	11.50 (292)	11.50 (292)	9.50 (241)	10.25 (260)	651 (296)	802 (364)
SD160120-4	16 Flanged	12 Flanged	3000	570					1								

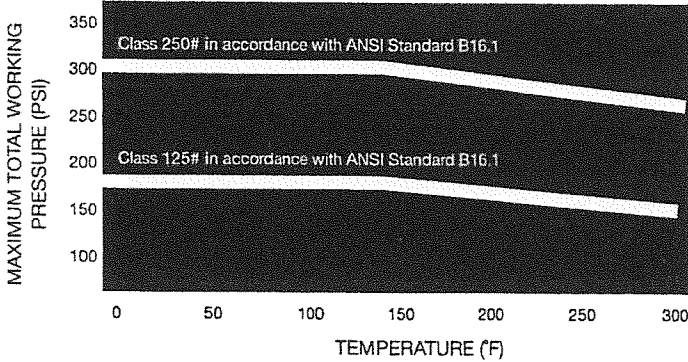
NOTE: Dimensions are in inches. Metric dimensions are in millimeters and are in parentheses (). Weights are in lb (kg).
 'C' is the distance required to replace strainer.
 Append 'A' for 250# working pressure (e.g. Model Number SD040030-4A).



MATERIALS OF CONSTRUCTION

- Body - Ductile Iron
- Cover - Ductile Iron
- Straightening Vanes - Stainless Steel (304)
- Permanent Strainer - Stainless Steel (304)
- Disposable Start Up Strainer - Bronze (16 Mesh)
- Cover O-Ring - EPDM

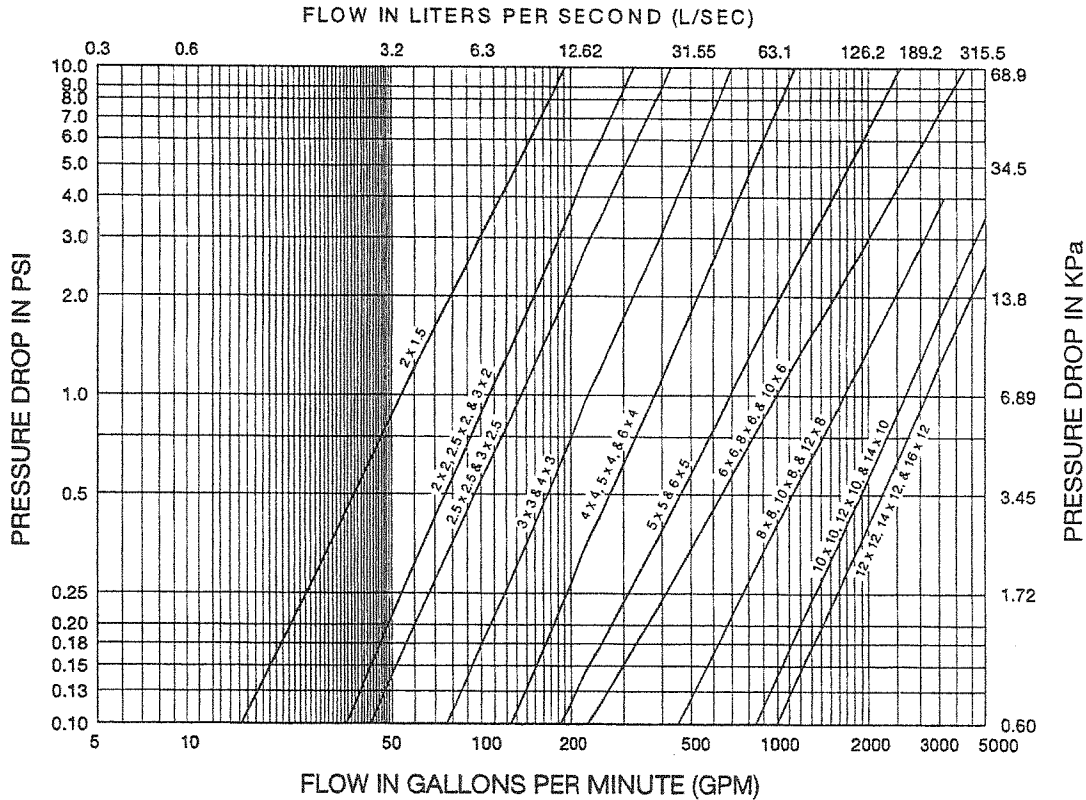
PRESSURE TEMPERATURE RATINGS



OPERATING SPECIFICATIONS

	Standard	Optional
Flange	Class 125*	Class 250*
Pressure	175 PSIG* (1210 KPA)	300 PSIG* (2070 KPA)
Temperature	250°F (120°C**)	250°F (120°C**)

- * Per Pressure Temperature Ratings chart to left.
- ** For operating temperatures above 250°F, a cooled flush is required and is recommended for temperatures above 225°F for optimum seal life. On closed systems, cooling is accomplished by inserting a small heat exchanger in the flush line to cool the seal flushing fluid.



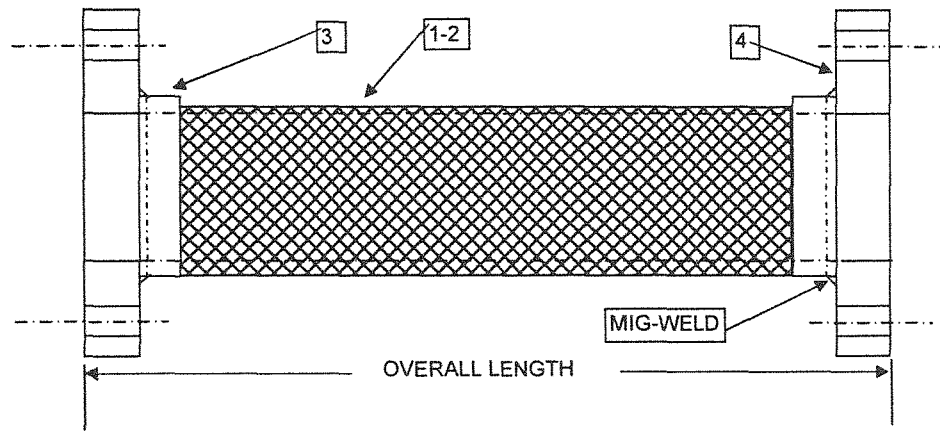
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 Visit our web site at: <http://www.taco-hvac.com>

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TCHS-FLG



MATERIALS:

#1-2 HOSE: STAINLESS STEEL HOSE WITH 1 LAYER OF STAINLESS BRAID

#3 BRAID COLLAR: T-304 STAINLESS STEEL

#4 FLANGES: CARBON STEEL PLATE FLANGES 150# DRILL

QTY	MODEL NUMBER	SIZE	OVERALL LENGTH	MAX O.D.	WRK. PSIG	@ TEMP	MAX TEST	LATERAL OFFSET
	TCHS-150-FLG	1.5"	9"	5.5"	410	70° F	615	1/16"
	TCHS-200-FLG	2"	9"	6"	450	70° F	675	1/16"
	TCHS-250-FLG	2.5"	9"	7"	570	70° F	855	1/16"
	TCHS-300-FLG	3"	9"	7.5"	450	70° F	675	1/16"
1	TCHS-400-FLG	4"	14"	9"	285	70° F	428	1/16"
	TCHS-500-FLG	5"	11"	10"	210	70° F	315	1/16"
	TCHS-600-FLG	6"	11"	11"	240	70° F	360	1/16"
	TCHS-800-FLG	8"	12"	13.5"	217	70° F	326	1/16"
	TCHS-1000-FLG	10"	13"	16"	165	70° F	248	1/16"
	TCHS-1200-FLG	12"	14"	19"	155	70° F	233	1/16"
	TCHS-1400-FLG	14"	14"	21"	125	70° F	188	1/16"
	TCHS-1600-FLG	16"	14"	23.5"	110	70° F	165	1/16"

TEMPERATURE DERATING FACTORS: MULTIPLY X WRK. PSIG

200° F	250° F	300° F	350° F	400° F	500° F	600° F	700° F
0.94	0.92	0.88	0.86	0.83	0.78	0.74	0.7

CUSTOMER: *Tag 4-P2*

PROJECT: *St Cloud VA Medical Center*

ENGINEER:

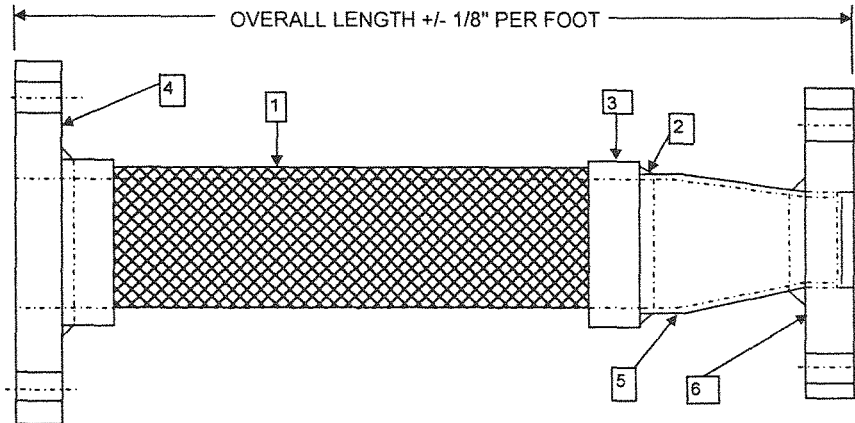
PO#:

TWIN CITY HOSE, INC 20615 COMMERCE BLVD. ROGERS, MN 55374

Phone 800-670-9475 Fax 763-428-5111 www.twincityhose.com



RCFF

**MATERIALS:**

#1 HOSE & BRAID: T-321 STAINLESS STEEL HOSE & 1 LAYER STAINLESS STEEL BRAID

#2 #3 BRAID COLLAR: STAINLESS STEEL HELI-ARC WELD/ MIG WELD
STAINLESS STEEL BRAID COLLAR#4 #6 FITTINGS: 150# CARBON STEEL PLATE FLANGE-FLAT FACE
150# CARBON STEEL PLATE FLANGE-FLAT FACE REDUCED END

#5 REDUCER: SCH 40 CARBON STEEL CONCENTRIC WELD REDUCER

QTY	MODEL NUMBER	DESCRIPTION	WRK PSI	@ TEMP	LATERAL OFFSET	LARGE END SIZE	SMALL END SIZE
	RCFF1210	12"X10"X20" OAL REDUCER	155	70° F	3/16"	12"	10"
	RCFF1008	10"X8"X18" OAL REDUCER	165	70° F	3/16"	10"	8"
	RCFF1006	10"X6"X18" OAL REDUCER	165	70° F	3/16"	10"	6"
	RCFF0806	8"X6"X18" OAL REDUCER	217	70° F	1/4"	8"	6"
	RCFF0805	8"X5"X18" OAL REDUCER	217	70° F	1/4"	8"	5"
	RCFF0804	8"X4"X18" OAL REDUCER	217	70° F	1/4"	8"	4"
	RCFF0605	6"X5"X17" OAL REDUCER	240	70° F	3/8"	6"	5"
	RCFF0604	6"X4"X17" OAL REDUCER	240	70° F	3/8"	6"	4"
	RCFF0603	6"X3"X17" OAL REDUCER	240	70° F	3/8"	6"	3"
	RCFF0504	5"X4"X16" OAL REDUCER	210	70° F	3/8"	5"	4"
	RCFF0503	5"X3"X16" OAL REDUCER	210	70° F	3/8"	5"	3"
	RCFF0525	5"X2-1/2"X16" OAL REDUCER	210	70° F	3/8"	5"	2-1/2"
	RCFF0403	4"X3"X17" OAL REDUCER	285	70° F	3/8"	4"	3"
	RCFF0425	4"X2-1/2"X13" OAL REDUCER	285	70° F	3/8"	4"	2-1/2"
	RCFF0402	4"X2"X13" OAL REDUCER	285	70° F	3/8"	4"	2"
	RCFF0325	3"X2-1/2"X13" OAL REDUCER	450	70° F	3/8"	3"	2-1/2"
	RCFF0302	3"X2"X13" OAL REDUCER	450	70° F	3/8"	3"	2"
	RCFF0315	3"X1-1/2"X13" OAL REDUCER	450	70° F	3/8"	3"	1-1/2"
	RCFF2502	2-1/2"X2"X13" OAL REDUCER	570	70° F	3/8"	2-1/2"	2"
	RCFF2515	2-1/2"X1-1/2"X13" OAL REDUCER	570	70° F	3/8"	2-1/2"	1-1/2"

TEMPERATURE DERATING FACTORS: MULTIPLY X WRK PSIG

200° F	250° F	300° F	350° F	400° F	500° F	600° F	700° F
0.94	0.92	0.88	0.86	0.83	0.78	0.74	0.7

CUSTOMER:

Tag - 4-PI

PROJECT:

St Cloud VA Medical Center

ENGINEER:

PO#:

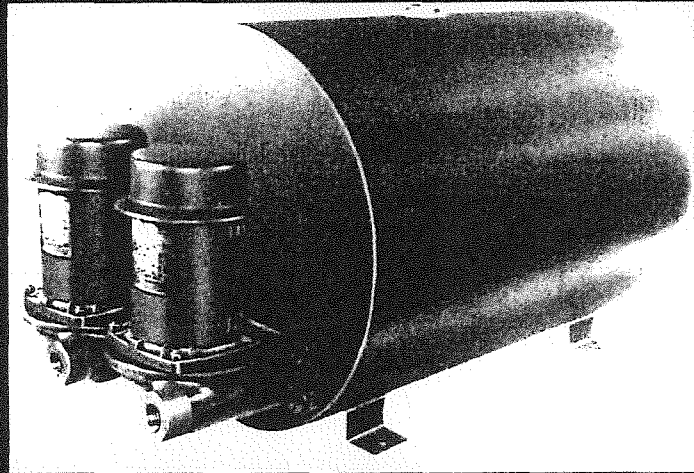
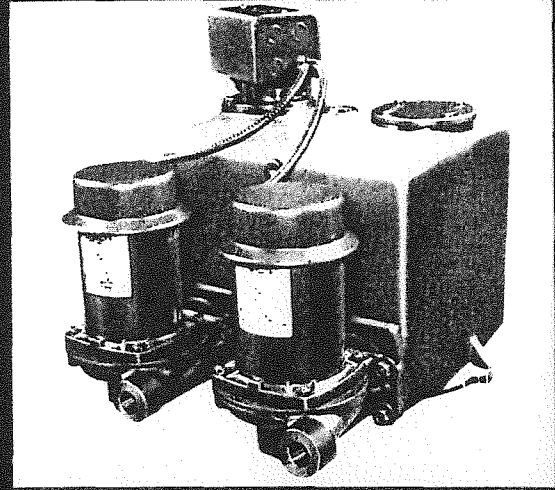
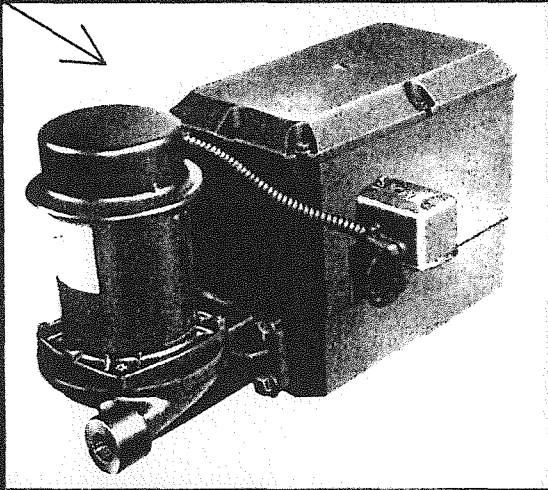
TWIN CITY HOSE, INC 20615 COMMERCE BLVD. ROGERS, MN 55374

Phone 800-670-9475

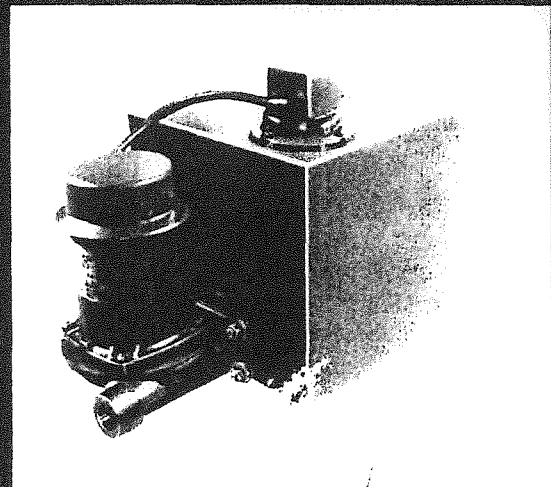
Fax 763-428-5111

www.twincityhose.com

Job: St Cloud VA Medical Center. Section: CONDENSATE PUMP (ALT 1).
Tag: 4-CP1 Contractor: El Jay P&H



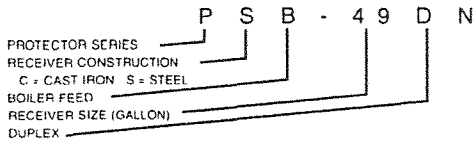
**See inside
for expanded
capacities**



DESCRIPTION

The Protector Series condensate and boiler feed units are capable of handling hot (210° F) or cold water. The series is available in simplex or duplex; either condensate return or boiler feed. Many units have low profiles for low headroom applications.

TYPICAL CATALOGUE CODE



COMPARISON GUIDE

VENT-RITE "PROTECTOR"	HOFFMAN "WATCHMAN"
--------------------------	-----------------------

CONDENSATE UNITS

PC-6N	WC-6-20B
PC-15N	WC-12-20B
PC-15DN	WCD-12-20BMA
PC-21N	
PC-21DN	
PS-10N	WCS-8-20B
PS-20N	
PS-20DN	

BOILER FEED UNITS RECTANGLE

PSB-20N
PSB-20DN

BOILER FEED UNITS HORIZONTAL

PSB-49N
PSB-49DN
PSB-71N
PSB-71DN
PSB-117N
PSB-117DN
PSB-150N
PSB-150DN

BOILER FEED UNITS VERTICAL

VPSB-49N	50VBFS-B
VPSB-49DN	50VBFD-B
VPSB-71N	
VPSB-71DN	
VPSB-117N	100VBFS-B
VPSB-117DN	100VBFD-B
VPSB-110N	
VPSB-110DN	
• VPSB-211J	200VBF-S
• VPSB-211JD	200VBF-D

• Note: Pump capacity 30 gpm at 20 psi discharge 3/4 hp. All boiler feed systems simplex and duplex with make-up valve and sight glass.

SPECIFICATIONS

Receiver: Steel or cast iron

Volute: Cast iron

Seal plate: Cast iron

Impeller: Non-ferrous material

Mechanical seal: John Crane type 6 or equal, ceramic and CraneCarb seal faces, neoprene, EPT and Buna-N elastomers, stainless steel metal parts (Crane Packing Co.

CraneCarb is a phenolic bonded carbon graphite)

Float switch: Simplex

units normally open

contacts which energize pump on demand (liquid rise)

Mechanical alternator: Duplex unit equalizes running time between two pumps and provides emergency backup in case of excessive liquid return or pump failure.

3/8" Make-up valve: Maximum inlet psi 80 (boiler feed operation)

Casing gasket: Cellulose fiber chloroprene

Water slinger: Neoprene

Hardware: Stainless steel, brass (cadmium plated)

Maximum limits: Liquid temperature 210°F, ph range: 4-9

Close coupled motor: Square flange, 1/3 hp, 115/230 ODP, 3450 RPM, permanently grease lubricated shielded ball bearings, threaded stainless steel shaft, Capacitor start, induction run, built-in thermal overload protection with automatic reset.

Suction isolation valve: (optional)

PUMP CHARACTERISTICS

GPM	PSI	NPSHR
10	25	2'
20	20	2'
30	15	2'
40	10	3.5'

APPLICATIONS

- Boiler feed
- Condensate transfer
- Air conditioning
- Heating
- Liquid transfer
- Residential effluent
- Remote liquid transfer
- Assembly line drainage

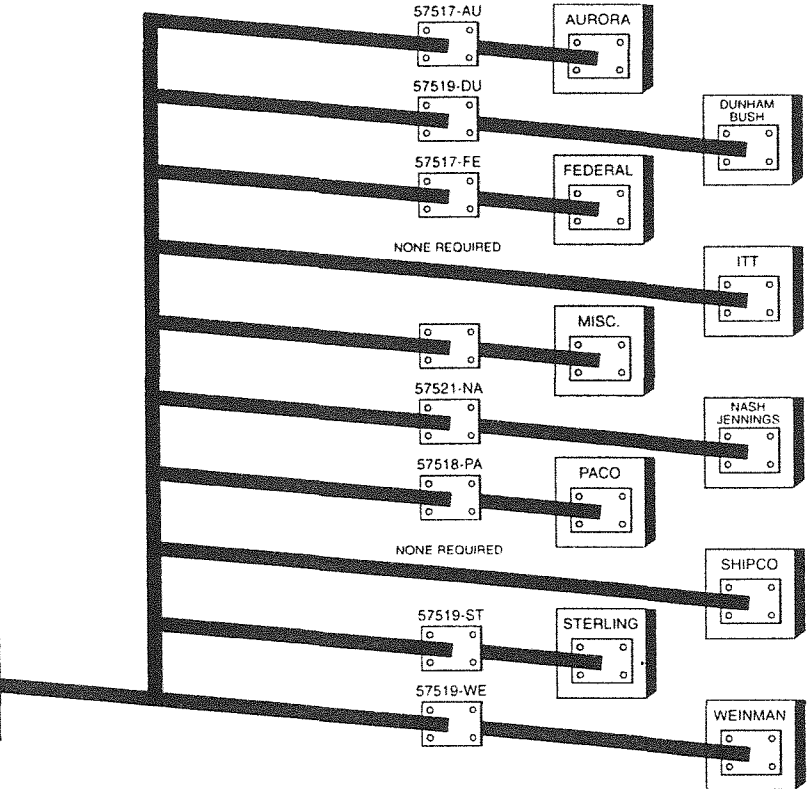
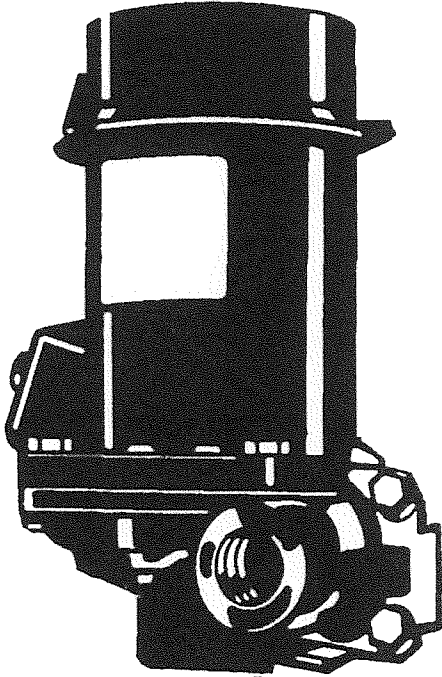
FEATURES

- Low NPSHR requirements
- Multiple profiles for specific applications
- Expertly designed for maneuverability
- Simplicity in field hook up
- Versatile compatibility of handling 210°F water
- Competitively priced
- Manufactured in the US by a team of professional craftsmen
- Industry leader in prompt delivery
- Largest selection to fit many different applications
- Simplex units equipped for future second pump (except PC-6N and PS-10N)
- All units factory tested

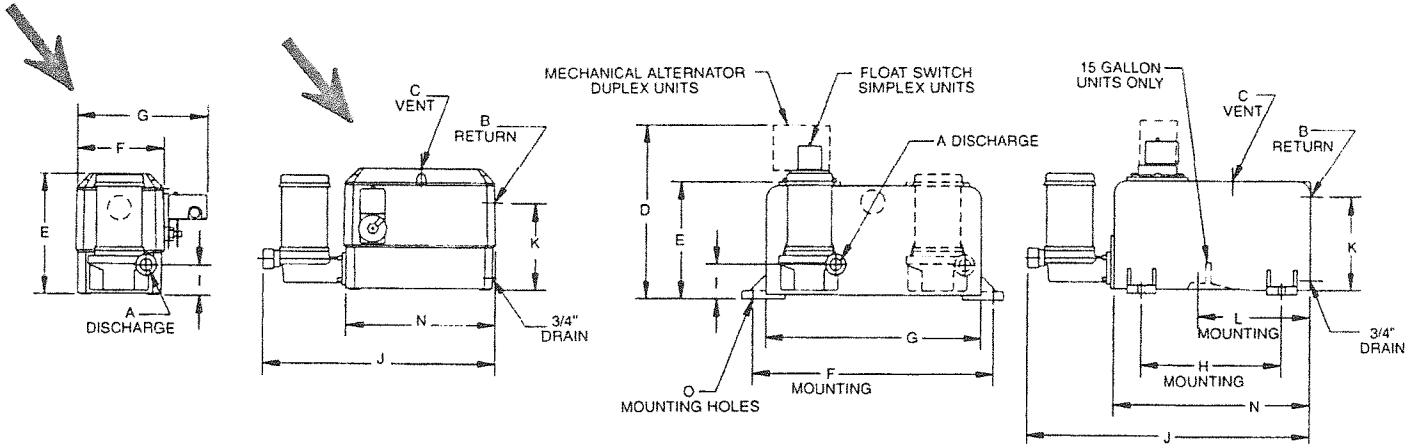


COMPLETE PUMP AND MOTOR ASSEMBLY

Interchangeability



STOCK PUMP ASSEMBLY



End view
Cast iron 6 gallon
Simplex unit

Side view
Cast iron 6 gallon
Simplex unit

End view
Cast iron 15 and 21 gallon
Simplex and duplex units

Side view
Cast iron 15 and 21 gallon
Simplex and duplex units

NOTE: All dimensions are approximate.

MODEL	UNIT STYLE	A	B	C	D	E	F	G	H	I	J	K	L	N	O
PC6N	Simplex 6 gallon	1	2	1	—	12.8	9.2	14.2	—	3.3	26	9.1	—	15.7	—
PC15N	Simplex 15 gallon	1	2	1	19.8	15.6	19.8	17.6	—	3.3	26.5	13.3	9.3	15.5	.6
PC15DN	Duplex 15 gallon	1	2	1	22.1	15.6	19.8	17.6	—	3.3	26.5	13.3	9.3	15.5	.6
PC21N	Simplex 21 gallon	1	2	1.2	17.5	12.7	25.5	22.7	14.9	4.1	31.8	10.2	—	20.7	.6
PC21DN	Duplex 21 gallon	1	2	1.2	19.8	12.7	25.5	22.7	14.9	4.1	31.8	10.2	—	20.7	.6



Submittal Data Information

U Tube Heat Exchangers

201-007T

Model G4208S 4" Diameter Steam, 2 Pass, 4' Length

JOB: St Cloud VA Medical Center

CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

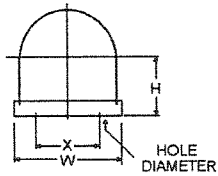
REP: RM Cotton Company

COMMENTS: Section 232213-2.9

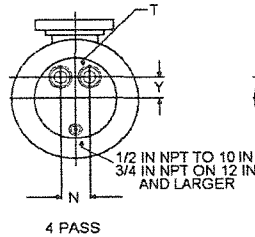
ITEM NO.	MODEL NO.	PASSES
4-C1	G04208-S	2

TUBESIDE	FLUID	FLOW (gpm)	TEMP. IN (F)	TEMP. OUT (F)	PRESS. DROP (ft)	VELOCITY (fps)
	Water	25	160	180	0.62	3.68

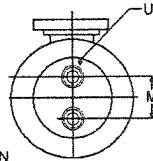
SHELLSIDE	STEAM	LBS. PER HOUR	SAT. STEAM TEMP.	STEAM PRESSURE		
		254	227.16	5		



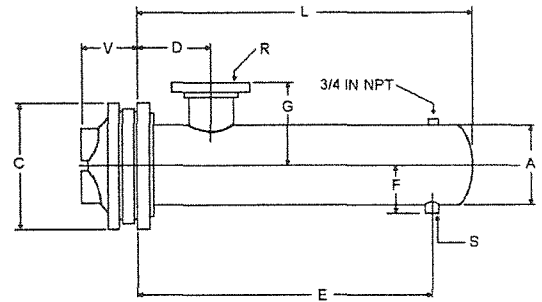
SADDLES (Optional)



4 PASS



2 PASS



* Dimensions in inches, heating surface in sq.ft., weight in lbs.

M	U	V	A	C	D	E	F	G	L	R	S	Heating Surface	Shipping Weight
2-1/2	1-1/2T	2-5/8	4-1/2	9	5	43-1/2	4	4	48-1/2	1-1/4T	1T	9.3	84

SADDLE DIMENSIONS: H-5-1/4; W-6-15/16; X-5-1/2; Hole Diameter.-1/2

MATERIALS OF CONSTRUCTION

	Standard	Optional
Shell	Steel	304ss, 316ss
Head	Cast Iron 4-10" Fabricated Steel 12-30"	Fabricated Steel, Cast Bronze, Fabricated 304ss/316ss
Tubes	3/4 x 20 BWG Copper	Cast Bronze, Fabricated 304ss/316ss
Tube Sheet	Steel	3/4 18 BWG Copper, Steel, 304ss, 316ss, 90/10 Cu Ni, Admiralty
Separators	Steel	Bronze, Brass, 304ss, 316ss, 90/10 Cu Ni
Working Pressure	150 PSIG (ASME)	Bronze, Brass, 304ss, 316ss, 90/10 Cu Ni
Max. Temperature	375 deg. F	Consult Factory
		Consult Factory

COMPARE. YOU'LL TAKE TACO.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401)942-8000 FAX: (401)942-2360.
TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436



Submittal Data Information

U Tube Heat Exchangers

201-008T

Model E6210S 6" Diameter Steam, 2 Pass, 5' Length

JOB: St Cloud VA Medical Center

CONTRACTOR: El Jay Plumbing & Heating

ENGINEER:

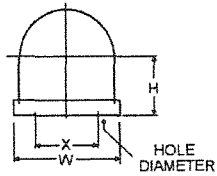
REP: RM Cotton Company

COMMENTS: Section 232213-2.9

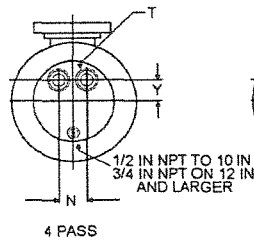
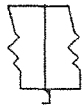
ITEM NO.	MODEL NO.	PASSES
4-C2	E06210-S	2

TUBESIDE	FLUID	FLOW (gpm)	TEMP. IN (F)	TEMP. OUT (F)	PRESS. DROP (ft)	VELOCITY (fps)
	P.G. 35%	35	150	180	0.42	2.38

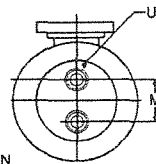
SHELLSIDE	STEAM	LBS. PER HOUR	SAT. STEAM TEMP.	STEAM PRESSURE
		514	227.16	5



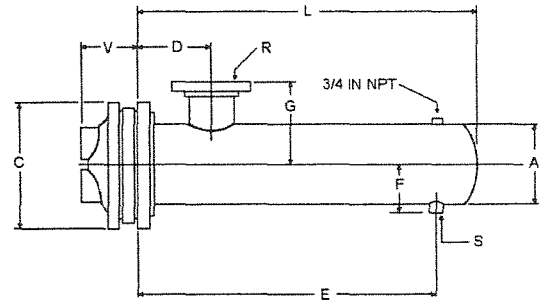
SADDLES (Optional)



4 PASS



2 PASS



* Dimensions in inches, heating surface in sq.ft., weight in lbs.

M	U	V	A	C	D	E	F	G	L	R	S	Heating Surface	Shipping Weight
4	2T	2-7/8	6-5/8	11	5	54-1/2	4-7/8	5-3/4	61	2-1/2T	1T	24.4	207

SADDLE DIMENSIONS: H-6-5/16; W-9-1/4; X-7-1/2; Hole Diameter-.5/8

MATERIALS OF CONSTRUCTION

	Standard	Optional
Shell	Steel	304ss, 316ss
Head	Cast Iron 4-10"	Fabricated Steel, Cast Bronze, Fabricated 304ss/316ss
	Fabricated Steel 12-30"	Cast Bronze, Fabricated 304ss/316ss
Tubes	3/4 x 20 BWG Copper	3/4 18 BWG Copper, Steel, 304ss, 316ss, 90/10 Cu Ni, Admiralty
Tube Sheet	Steel	Bronze, Brass, 304ss, 316ss, 90/10 Cu Ni
Separators	Steel	Bronze, Brass, 304ss, 316ss, 90/10 Cu Ni
Working Pressure	150 PSIG (ASME)	Consult Factory
Max. Temperature	375 deg. F	Consult Factory

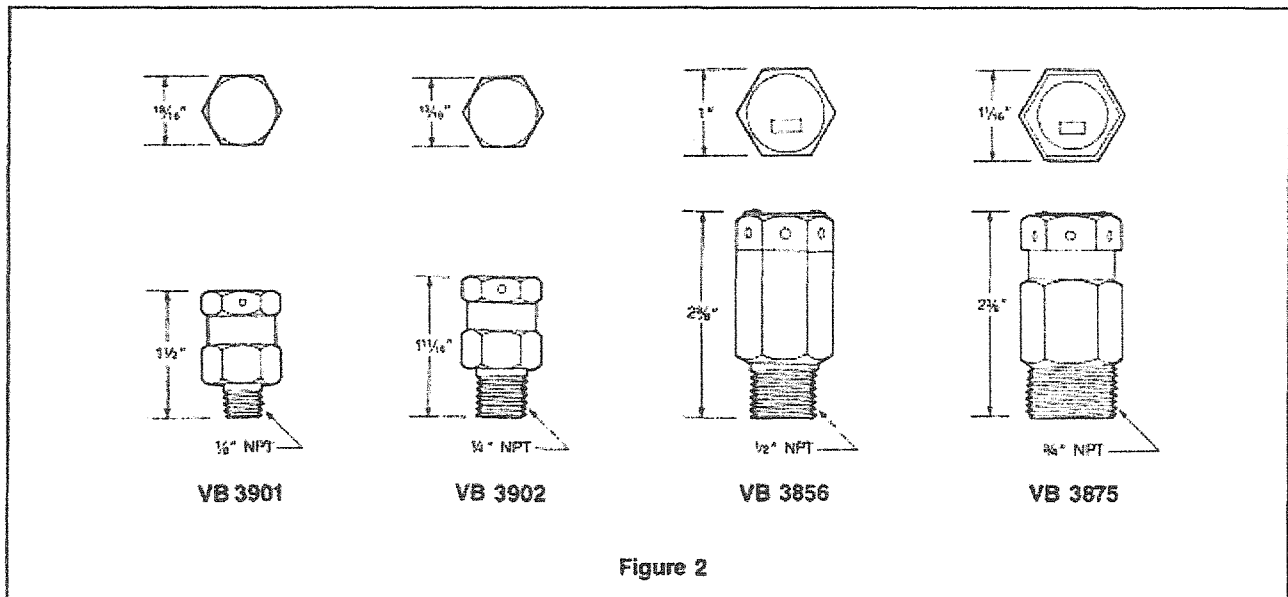
COMPARE. YOU'LL TAKE TACO.

TACO, INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401)942-8000 FAX: (401)942-2360.
 TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3. Telephone: 905/564-9422. FAX: 905/564-9436

Barnes & Jones Vacuum Breakers are simple, reliable devices that provide a positive means to automatically relieve or "break" an unwanted vacuum condition. The rugged hex design provides for long service life and ease of installation. Bubble tight sealing is assured due to the soft silicon O-ring and spring pressure against the valve.

Applications

- Air/Heat Coils for Space Heating
- Process Air Heater
- Shell & Tube Heat Exchanger
- Make-Up Air Coils
- Textile Dry Cans
- Steam Boilers
- Storage Heaters
- Jacketed Kettles
- Steam Main Zoning
- One Pipe Steam Non-Electric Valve



Vacuum Breaker Engineering Specifications

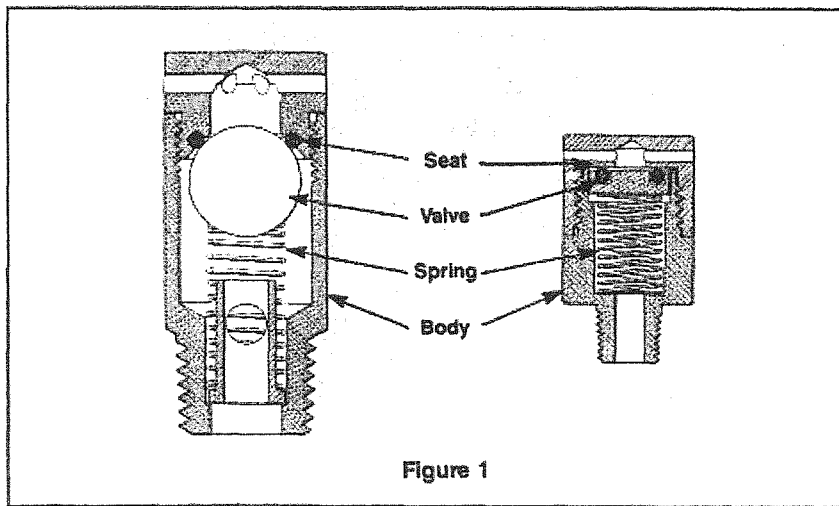


Figure 1





Materials

Model No.	Body	Spring	Valve	Seat
VB 3901	Brass	Stainless Steel	Brass and Silicon	Brass
VB 3902				
VB 3856	Brass	Stainless Steel	Stainless Steel	Silicon
VB 3875				



Models are available in four NPT Pipe Sizes. They are 1/8", 1/4", 1/2" and 3/4", all of which are rated for use with pressures up to 125 PSIG (8.6 Bar), and temperatures to 350°F (180°C). Materials of construction are listed in the table above.

Vacuum Required to Open (INCHES OF MERCURY)

Model No.	Horizontal*	Vertical		
		 Bottom Outlet	 Top Outlet	 No Spring
VB 3901	1.27	1.25	1.75	0.2
VB 3902				
VB 3856	0.77	0.75	1.25	0.3
VB 3875				



Barnes & Jones INC.

***Note on installation:** The preferred method of installation is in the **vertical** position. Horizontal installation should be used only if no other option is available and only above the water line. Vacuum breakers should be placed at the highest practical points.

The table above lists the corresponding "break" points for the various models and positions. Barnes & Jones will Custom Engineer to customer requirements in applications that require other "break" points.

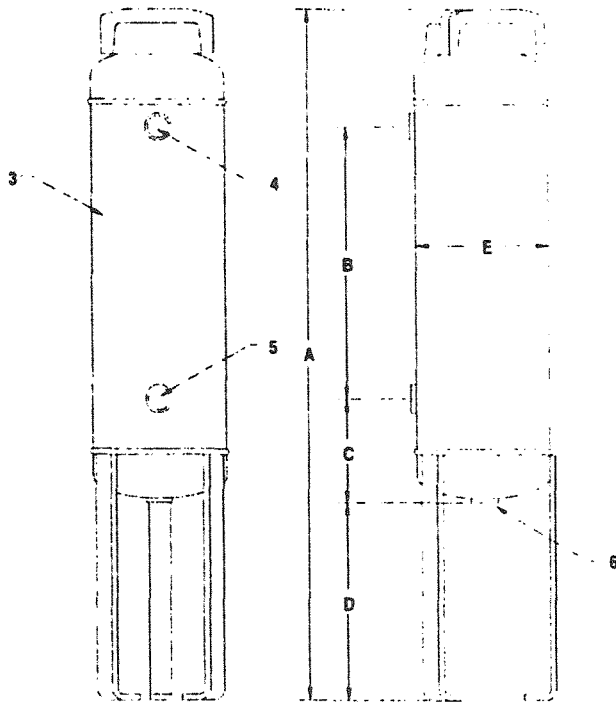
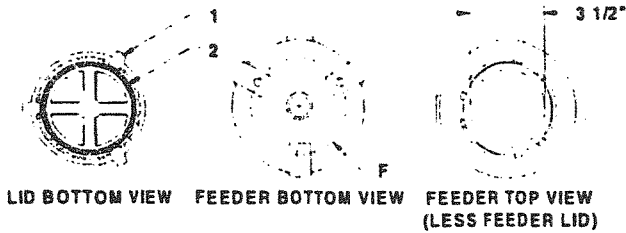
J.L. WINGERT CO.

P.O. Box 6207 • Garden Grove, CA 92846-6207 / 11800 Monarch Street • Garden Grove, CA 92841-2113
 Phone (714) 379-5519 • Fax (714) 379-5549 ■ Email: customerservice@jllwingert.com
 Northern California Region • Phone (510) 487-5310 ■ Southwest Region • Phone (602) 470-1015
 www.jllwingert.com

MANUFACTURING: Mixers, Bypass Feeders, Filter Feeders, Bromine Feeders, Sample Coolers, Sludge Traps, Separators, Separator Systems, Tank Stands,
 Tank Package Systems, Glycol Feed Systems, Coupon Racks, Control Stations, NEMA Enclosures, Custom Packaged Systems and Specialty Welding

Specification Sheet #032002 Rev. "F" (12/99)

DOME BOTTOM BYPASS FEEDERS



PARTS, MATERIALS AND SPECIFICATIONS:

KEY	PART	SPECIFICATIONS
1	3071	CLOSURE: 3 1/2" cast iron, 1/4 turn closure. (O-ring included)
2	3072	O-RING: Buna-N O-ring 200° F
3		BODY: Carbon steel
4		OUTLET: 3/4" FNPT
5		INLET: 3/4" FNPT
6		DRAIN: 3/4" FNPT
MAX. PRESSURE		200 PSI (13.6 BAR)
MAX. TEMPERATURE		200° F (93° C)

VOLUME (FILL CAPACITY)

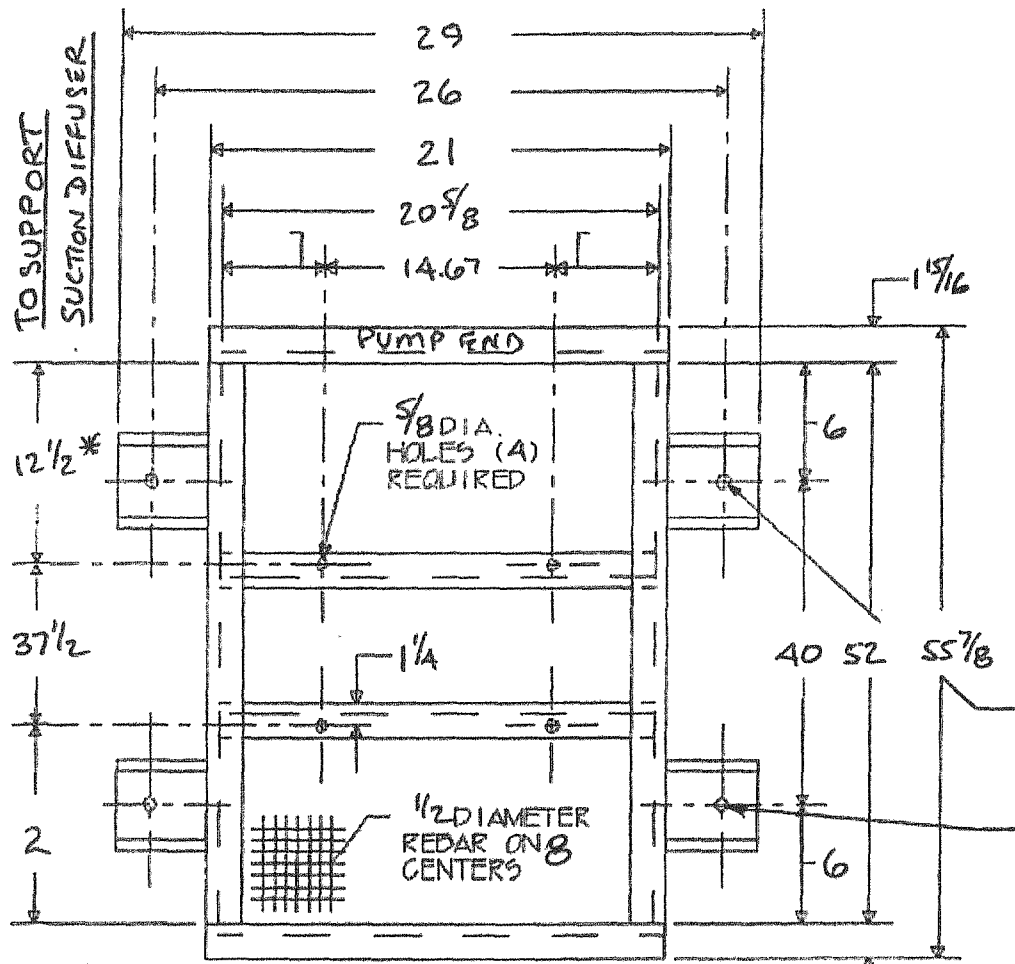
MODEL	GALLONS	• LITERS
DB-2HD	2.39	9.04
DB-5HD	6.30	23.85
DB-12HD	13.28	50.27
DB-18HD	19.74	74.72

DIMENSIONS, WEIGHT & CUBE:

KEY	DB-2HD	DB-5HD	DB-12HD	DB-18HD
A	31 3/8"	31 5/8"	52 1/8"	70 7/8"
B	12 1/2"	10 3/4"	31"	44"
C	4 3/4"	6 1/2"	6 1/2"	10 7/8"
D	8 3/4"	7 3/4"	7 3/4"	7 3/4"
E	6"	10"	10"	10"
F	4"	8"	8"	8"
WEIGHT	23 lbs. (10.4 kgs.)	37 lbs. (16.8 kgs.)	62 lbs. (28.1 kgs.)	86 lbs. (39 kgs.)
CUBE	6" X 6" X 32"	10" X 10" X 32"	10" X 10" X 53"	10" X 10" X 72"

Note: All dimensions are +/- 1/8". All weights are approximate. All dimensions are subject to change without notice.

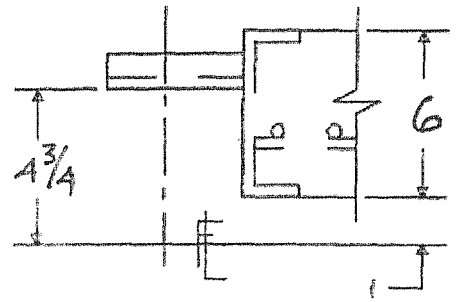
* BASE EXTENDED
TO SUPPORT
SUCTION DIFFUSER



- INSTALLATION INSTRUCTIONS:
- (1) FIELD CHECK RediPOUR BASE DIMENSIONS AND ALL EQUIPMENT HOLE LOCATIONS.
 - (2) COVER AREA BELOW RediPOUR BASE WITH WATER PROOF PLASTIC OR ROOFING PAPER.
 - (3) IF RediPOUR BASE IS SHIPPED IN TWO SECTIONS, BOLT AND WELD TOGETHER.
 - (4) INSERT AND BOLT OR WELD ANCHOR BOLTS (BY CONTRACTOR) IN TEMPLATE HOLES.
 - (5) POUR CONCRETE TILL LEVEL WITH TOP OF RediPOUR BASE.
 - (6) AFTER CONCRETE HAS SET, RAISE BASE 1" OR 2" AS SHOWN ON DRAWING AND INSTALL SPACER UNDER RediPOUR BASE.
 - (7) SECURE (BOLT) EQUIPMENT TO RediPOUR BASE.
 - (8) LOCATE VIFLEX SPRING MOUNTINGS UNDER HEIGHT SAVING BRACKETS AND ADJUST AND LEVEL BASE.
 - (9) REMOVE SPACER BLOCKS.

OM-1-174 SPRING MOUNTINGS
TWO(2) REQ'D PER BASE

OM-1-173 SPRING MOUNTINGS
TWO(2) REQ'D PER BASE

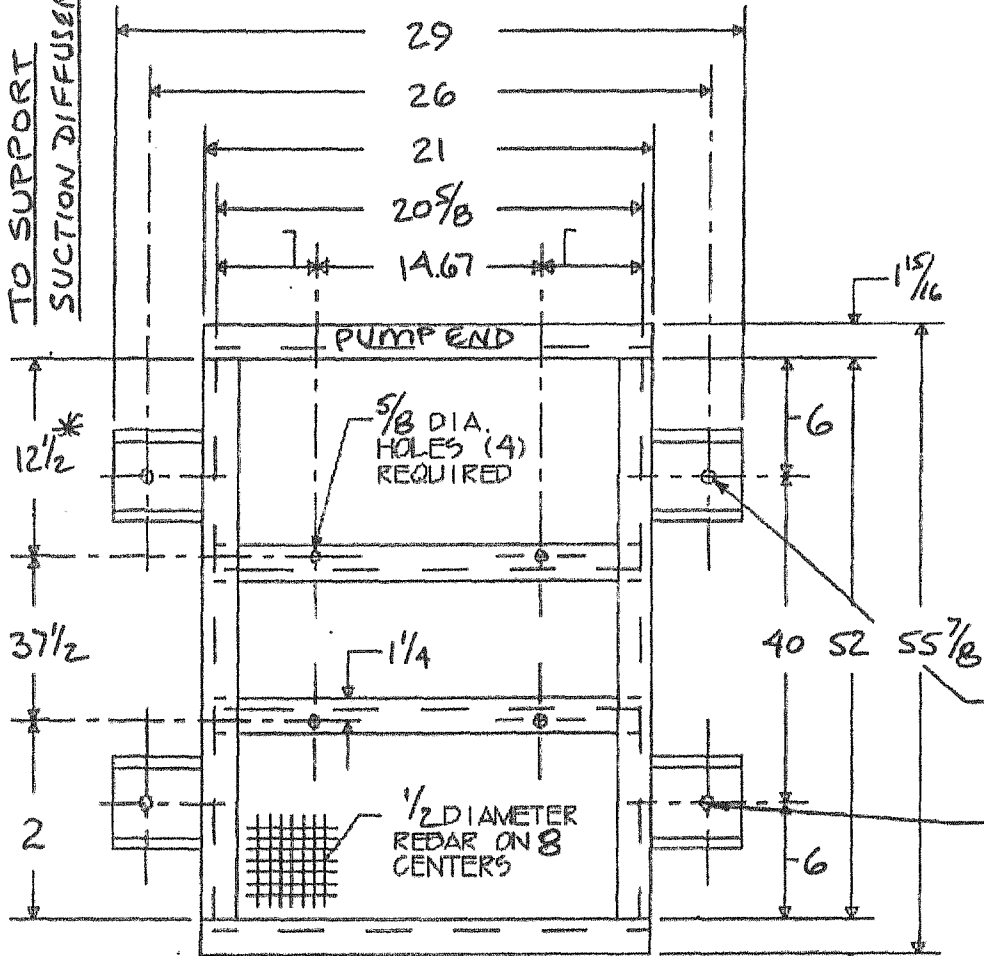


(2) RediPOUR CONCRETE INERTIA BASE POURING FORM COMPLETE WITH STRUCTURAL STEEL PERIMETER CHANNEL, EQUIPMENT LOCATING TEMPLATES, REINFORCING ROD WELDED IN PLACE, HEIGHT SAVING BRACKETS AND VIFLEX SPRING TYPE MOUNTINGS.

TAG: PUMP P-1, P-2

REVISIONS:	DWN BY: <u>DLB</u> CHK BY: <u>S</u> SCALE: <u>NONE</u> DATE: <u>11-7-11</u>	CUSTOMER: <u>COTTON COMPANY</u> PROJECT: <u>ST. CLOUD VA HOSP CTR</u> CONTRACTOR: VIC No: <u>33361</u> P.O. No: <u>39597</u> TAG: <u>2 HPTACO FI3007 PUMPS</u>	THE VIBRATION ISOLATION CO., INC. 225 GRAND STREET PATERSON, N.J. 07501 DRAWING No: <u>A-33361-A</u>
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* BASE EXTENDED
 TO SUPPORT
 SUCTION DIFFUSER

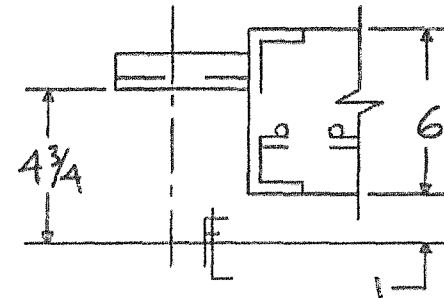


INSTALLATION INSTRUCTIONS:

- (1) FIELD CHECK RediPOUR BASE DIMENSIONS AND ALL EQUIPMENT HOLE LOCATIONS.
- (2) COVER AREA BELOW RediPOUR BASE WITH WATER PROOF PLASTIC OR ROOFING PAPER.
- (3) IF RediPOUR BASE IS SHIPPED IN TWO SECTIONS, BOLT AND WELD TOGETHER.
- (4) INSERT AND BOLT OR WELD ANCHOR BOLTS (BY CONTRACTOR) IN TEMPLATE HOLES.
- (5) POUR CONCRETE TILL LEVEL WITH TOP OF RediPOUR BASE.
- (6) AFTER CONCRETE HAS SET, RAISE BASE 1" OR 2" AS SHOWN ON DRAWING AND INSTALL SPACER UNDER RediPOUR BASE.
- (7) SECURE (BOLT) EQUIPMENT TO RediPOUR BASE.
- (8) LOCATE VIFLEX SPRING MOUNTINGS UNDER HEIGHT SAVING BRACKETS AND ADJUST AND LEVEL BASE.
- (9) REMOVE SPACER BLOCKS.

OM-1-175 SPRING MOUNTINGS
TWO (2) REQ'D PER BASE

OM-1-174 SPRING MOUNTINGS
TWO (2) REQ'D PER BASE



(2) RediPOUR CONCRETE INERTIA BASE POURING FORM COMPLETE WITH STRUCTURAL STEEL PERIMETER CHANNEL, EQUIPMENT LOCATING TEMPLATES, REINFORCING ROD WELDED IN PLACE, HEIGHT SAVING BRACKETS AND VIFLEX SPRING TYPE MOUNTINGS.

TAG: PUMP P-3, P-4

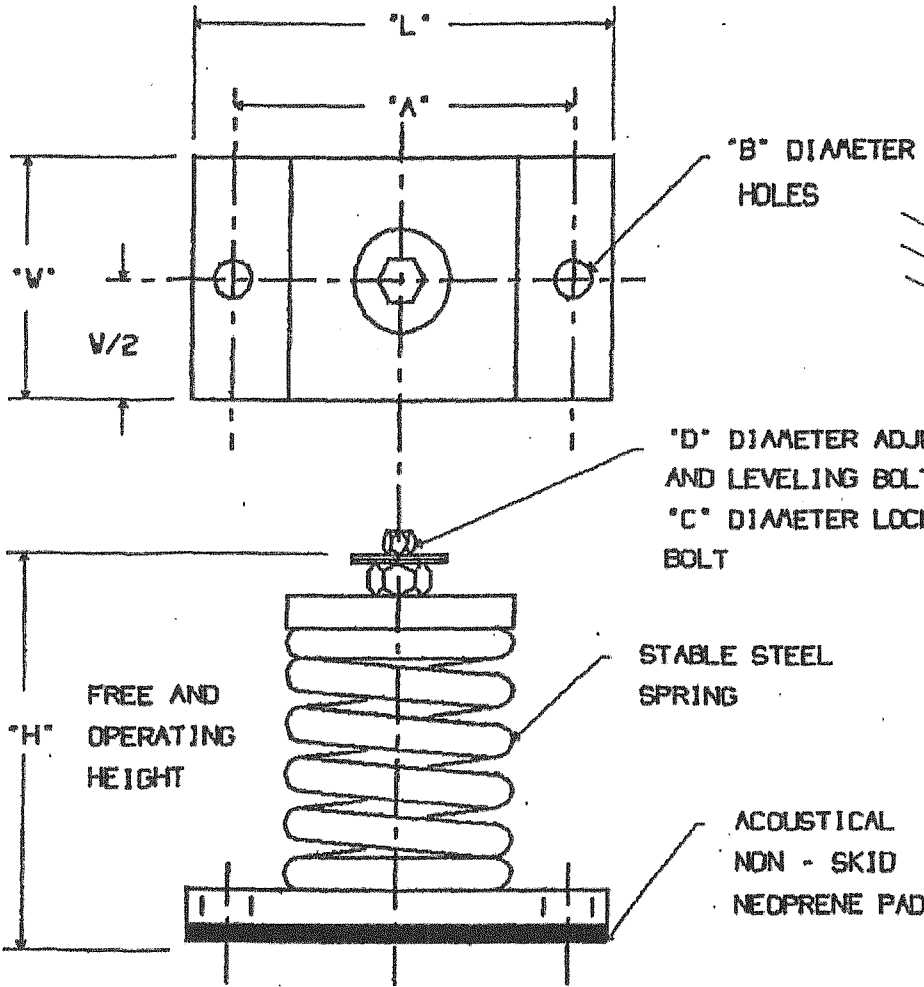
REVISIONS:

DWN BY: DLB
 CHK BY: g
 SCALE: NONE
 DATE: 11-7-11

CUSTOMER: COTTON COMPANY
 PROJECT: ST CLOUD VA MED CTR
 CONTRACTOR:
 VIC No: 33361 P.O. No: 39592
 TAG: 10 HP TACO FC3009 PUMPS

THE VIBRATION ISOLATION CO., INC.
 225 GRAND STREET
 PATERSON, N.J. 07501

DRAWING No: A-33361-B



PART NUMBER	RATED LOAD LBS	SPRING DEFLECTION	DIMENSIONS IN INCHES							
			L	W	H	A	B	C	D	
OML-1-101	25-50	1.20"								
OML-1-102	50-100	1.20"								
OML-1-103	100-150	1.20"								
OML-1-104	150-250	1.10"	4 1/2	2 3/8	3 1/2	9/16	5/16	1/2		
OML-1-105	250-350	1.10"								
OML-1-106	350-450	1.00"								
OML-1-107	450-600	1.00"								
OM-1-171	75-150	1.30"								
OM-1-172	150-250	1.30"								
OM-1-173	250-350	1.30"								
OM-1-174	350-500	1.30"	4 1/2	2 4/8	3 1/2	9/16	5/16	1/2		
OM-1-175	500-600	1.10"								
OM-1-176	600-750	1.10"								
OM-1-177	750-900	1.10"								
OM-1-178	900-1100	1.00"								
OM-1-1200	65-130	1.30"								
OM-1-1208	130-210	1.30"								
OM-1-1210	210-300	1.30"								
OM-1-1300	300-400	1.30"								
OM-1-1308	400-500	1.30"								
OM-1-1310	500-570	1.30"								
OM-1-1311	570-600	1.30"								
OM-1-1400	600-700	1.30"								
OM-1-1408	700-800	1.20"								
OM-1-1410	800-900	1.20"								
OM-1-1411	900-950	1.20"	6 1/4	4 5/8	5	9/16	3/8	3/4		
OM-1-1500	950-1050	1.10"								
OM-1-1509	1050-1200	1.10"								
OM-1-1511	1200-1300	1.10"								
OM-1-1512	1300-1400	1.10"								
OM-1-1513	1400-1500	1.10"								
OM-1-1600	1500-1600	1.10"								
OM-1-1609	1600-1700	1.10"								
OM-1-1610	1700-1800	1.10"								
OM-1-1612	1800-1900	1.10"								
OM-1-1614	1900-2200	1.10"								
OM-1-1615	2200-2400	1.10"								
OM-1-1616	2400-2500	1.10"								

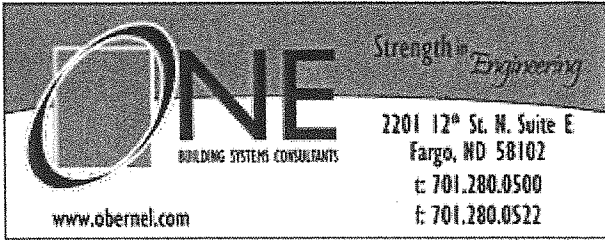
CUSTOMER: COTTON COMPANY
 PROJECT: ST. CLOUD VA MED. CTR
 P.O. No: 39597 VIC JOB No: 33361
 CONTRACTOR: _____
 ENGINEER: _____

REVISIONS:

Dwn by: PST
 Chk by: HS
 Scale: CADD 3
 Date: 04/01/90

OML-1-101 - 107 1" DEFLECTION
 OM-1-171 - 178 1" DEFLECTION
 OM-1-1200 - 1616 1" DEFLECTION

VIBRATION ISOLATION CO., INC
 225 Grand Street
 Paterson, NJ 07501
 DRAWING No. A- 21000



SHOP DRAWING REVIEW COMMENTS

PROJECT NAME: Building 4 HVAC, VAMC
PROJECT LOCATION: St. Cloud, MN
ONE PROJECT # 2009254 SHOP DRAWING No. M3

CONTRACTOR: El-Jay Plumbing & Heating
PRODUCT MATERIAL/PRODUCT: Piping Material
MANUFACTURER: Weidbend
SPECIFICATION SECTION: 232113 SCHEDULE SHEET: -

Checking of shop drawings is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Review of the shop drawings by the Engineer or others does not relieve the contractor from his/her obligation to perform in accordance with the contract, the Drawings and Specifications, nor does it constitute an approval of any deviation from the Drawings and Specifications.

NO EXCEPTIONS NOTED MAKE CORRECTIONS NOTED REVISE / RESUBMIT REJECTED

DATE 12/5/2011 BY: Jim Nelson 

COMMENTS: _____

DOMESTIC - PIPE SUBMITTAL SPECIFICATION SHEET

20

PHYSICAL PROPERTIES
 TYPE
 Yield Point Min. (psi)
 Tensile Strength Min. (psi)

A53F
 CBW
 25000
 45000

A53A A53B
 ERW & SEAMLESS
 30000 35000
 48000 60000

A106A A106B
 SEAMLESS
 30000 35000
 48000 60000

TOLERANCES - WEIGHT WEIGHT CLASS

Standard (percent)
 Extra Strong (percent)
 Double Extra Strength (percent)

A53
 Plus 5
 5
 10

Minus 5
 5
 10

A106
 Plus 6.5
 6.5
 10

Minus 3.5
 3.5
 3.5

TOLERANCES - OUTSIDE DIAMETER NOMINAL SIZE INCHES

5" to 8" (inclusive)
 10" to 14" (inclusive)

1/64"
 1%

1/32"
 1%

A53
 Plus 1%
 1%

Minus 1/64"
 1%

1/32"
 1%

1/32"
 1/32"
 3/32"

A106
 Plus 1/32"
 1/32"
 3/32"

Minus 1/32"
 1/32"

TOLERANCES - WALL THICKNESS

All Sizes (percent)

A53
 Plus 12-1/2

Minus 12-1/2

A106
 Plus 12-1/2

Minus 12-1/2

SPECIFICATIONS FOR STANDARD PIPE TYPE

Standard
 ASTM A-53
 ANSI B-36.10M
 B-125.30

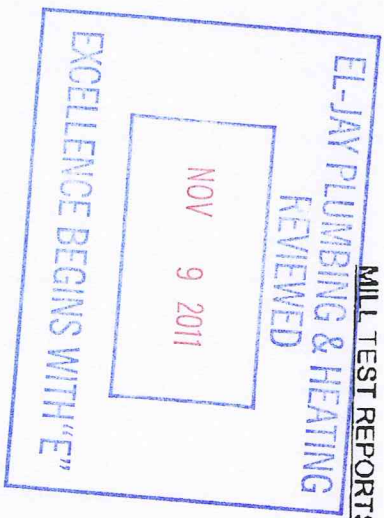
ASTM A-106
 ANSI B-36.10M
 B-125.30

PRODUCT/APPLICATION

Welded and Seamless Pipe, suitable for bending, flanging and similar forming operations. (Continuous weld pipe is not intended for flanging.)
 Sizes: 1/2" through 24"

Seamless carbon steel pipe for high-temperature service.
 (Also can be bent, coiled or flanged.)
 Sizes: 1/2" through 26"

MILL TEST REPORTS CAN BE FURNISH ON DELIVERD MATERIAL - UPON REQUEST



REVIEWED BY

SAGINAW CONTRACTING, INC.

BY [Signature] DATE 11-14-11

23 21 13-01



11-15-2011 P02:37

20

WELDBEND

Even with all the advances in technology today, the wholly welded piping system has for decades remained the best choice for use in high pressure and high temperature application. Many piping jobs in schools, industrial plants, refineries and factories have benefited from the inherent advantages of a completely welded system. It becomes a closed container joining pipes, valves, fittings, and flanges. A welded joint actually becomes part of the pipe, minimizing leak potential. This provides greater margins of safety, especially under conditions of high internal pressures. Additionally, welding fittings form a continuous metal structure with the pipe, adding forged-in strength to any piping system. Furthermore, smooth forged fittings simplify insulation and take up less space.

ASTM A 234

Scope

This standard covers wrought carbon steel fittings of seamless and welded construction which are manufactured to the dimensional specifications of ASME B16.9 and B16.28. These fittings are primarily for use in pressure piping and in pressure vessel fabrication for service at moderate and elevated temperatures.

Materials

The starting material for fittings shall consist of killed steel, forgings, bars, plates, seamless or fusion-welded tubular products with filler metal added and shall conform to the chemical requirements of ASTM A 234. Unless otherwise specified, carbon steel plates may be either coarse grain or fine grain practice.

Manufacture

Forging or shaping operations are performed by hammering, pressing, piercing, extruding, upsetting, rolling, bending, machining, or by a combination of two or more of these operations. The forming process shall be applied so that it will not produce injurious imperfections in the fittings.

Heat Treatment

Hot-formed WPB fittings, upon which the final forming operation is completed at a temperature above 1150°F and below 1800°F, need not be heat treated. **Cold-Formed** WPB fittings, upon which the final forming operation is completed at a temperature below 1150°F, shall be normalized, or shall be stress relieved at 1100°F to 1275°F.

Fitting Summary Data Sheet

Chemical requirements (in %):

Carbon	Manganese	Phosphorus (max)	Sulfur (max)
.30 max	.29-1.06	.050	.058

Silicon	Chromium	Molybdenum	Nickel	Copper
.10 min	.40 max	.15 max	.40 max	.40 max

Vanadium Columbium

.08 max	.02 max
---------	---------

Mechanical requirements:

Tensile Strength	60,000-85,000 psi
Yield Strength (min)	35,000 psi
Elongation - Longitudinal:	22%
- Transverse:	14%

Dimensions

Butt-welding fittings and butt-welding short radius elbows and returns purchased in accordance with this specification shall conform to the dimensions and tolerances given in the latest revision of ANSI B16.9 and B16.28, respectively.

Certification

When requested by the purchaser, the manufacturer shall provide a certificate of compliance to this specification.

If requested to provide test reports, the manufacturer shall also provide the following where applicable:

* Chemical analysis results. When the amount of an element is less than .02%, the analysis for that element is reported as "<0.02%."

* Tensile property results, report the yield strength and ultimate strength in ksi [or MPa] and elongation in percent,

* Hardness acceptable in accordance with Section 10 of ASTM A-234,

* Seamless or Welded,

* Type of Heat Treatment, if any,

* Starting material, specifically pipe, plate, etc.,

* Statement regarding radiographic or ultrasonic examination.

* Any supplemental testing required by the purchase order.

Product Marking

All fittings shall have the prescribed information stamped or otherwise suitable marked on each fitting in accordance with ASTM A 234/MSS SP-25. A

Weldbend fitting is marked as follows:

Weldbend's Name, Nominal Pipe Size, Pipe Wall Thickness Designation, Material Grade (WPB/WPC) and Heat Identification Number.

Note: All information contained in this document, and for a complete description of all requirements, refer to ASTM A 105. Sheets are subject to change without notice.