



**Purchasing Division**  
*Finance Department*  
Room 120  
411 West First Street  
Duluth, Minnesota 55802

☎ 218-730-5340  
✉ [purchasing@duluthmn.gov](mailto:purchasing@duluthmn.gov)

**Addendum 2**  
**Solicitation 25-99622**  
**Lakewood Filter Rehabilitation Design and Bidding Phase**

This addendum serves to notify all bidders of the following changes to the solicitation documents:

- Exhibit A – Lakewood Water Treatment Plant Plans Circa 1975 & 1991 has been added to this solicitation and is attached to this addendum.

Please acknowledge receipt of this Addendum by including a copy of it with your proposal. The pages included will not count toward any page limitation, if any, identified in the RFP.

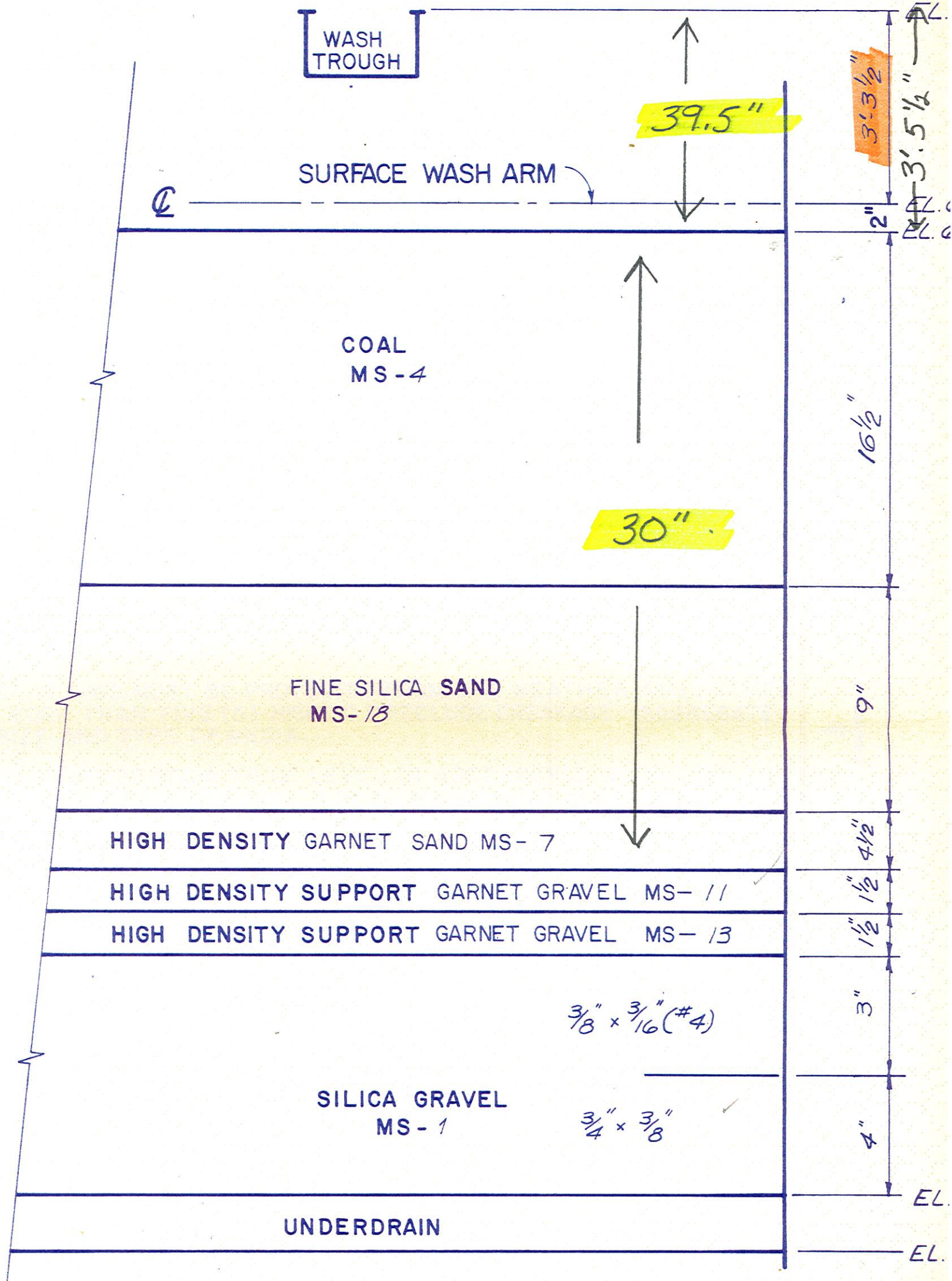
Posted: **July 25, 2025**

# EXHIBIT A

## LAKEWOOD WATER TREATMENT PLANT PLANS CIRCA 1975 & 1991

### FILTRATION FLOCCULATION & SEDIMENTATION WASHWATER

advanced water and wastewater treatment equipment



MEDIA DESIGN

"This drawing and information contained thereon is the property of Neptune Microfloc Incorporated and must not be used in any way detrimental to the interest of the corporation. This drawing must be returned at the request of Neptune Microfloc Inc."

SCALE: **NONE**

**NOTE:**  
DO NOT SCALE FROM THIS DRAWING TO OBTAIN DIMENSIONS.



neptune microfloc incorp  
a subsidiary of neptune internat

No.	Zone	Revision	App'd	Date	Eff.
-----	------	----------	-------	------	------

42.67'

9.375'  
7.21'

FILTER DATA	
FILTER BAY SIZE	16'-4" x 32'-8"
AREA PER BAY	533.5 FT <sup>2</sup>
NO. BAYS PER FILTER	2
AREA PER FILTER	1067 FT <sup>2</sup>
TOTAL NUMBER OF FILTERS	3
TOTAL FILTER AREA	3201 FT <sup>2</sup>
UNDERDRAIN TYPE	LEOPOLD
BACKWASH RATE PER SQ. FT. AT 60°F (WATER)	15 G.P.M./FT <sup>2</sup>
TOTAL BACKWASH FLOW RATE PER FILTER AT 60°F	16005 G.P.M.

**NOTES:**

- MEDIA IN BAGS MUST BE PROTECTED FROM THE WEATHER AND STACKED NOT MORE THAN FIVE (5) HIGH TO PRECLUDE BREAKAGE - SEGREGATE BY SIZE AND TYPE OF MEDIA.
- ALL LAYERS OF MEDIA TO BE LEVEL IN ACCORDANCE WITH N.M.I. MEDIA & GRAVEL PLACEMENT SPECS. *B&V SPECS TO GOVERN*
- ALL LAYERS OF MEDIA & GRAVEL TO BE WITHIN THE FOLLOWING TOLERANCES:
 

1 1/2" TO 3" LAYERS	± 1/4"
3" TO 6 1/2" LAYERS	± 1/2"
6 1/2" OR LARGER LAYER	± 1"
FINISHED GRAVEL DEPTH	± 1"
FINISHED FILTER BED	± 1"
- FILTER MEDIA AND GRAVEL PLACEMENT MUST BE DONE UNDER N.M.I. TECHNICAL DIRECTION AFTER ALL ELECTRICAL HYDRAULIC AND CONTROL SYSTEMS ARE INSTALLED AND/OR REPAIRED AND OPERABLE PRIOR TO ARRIVAL OF THE TECHNICAL DIRECTOR.

35.875'

35.00'

*Filters Nos. 2, 3 & 4*

NO EXCEPTIONS NOTED

EXCEPTIONS NOTED

RETURNED FOR CORRECTION

**MAR 18 1976**

REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS OR DEVIATIONS FROM CONTRACT REQUIREMENTS

**BLACK & VEATCH**

*Div. 13 B  
Filter Media*



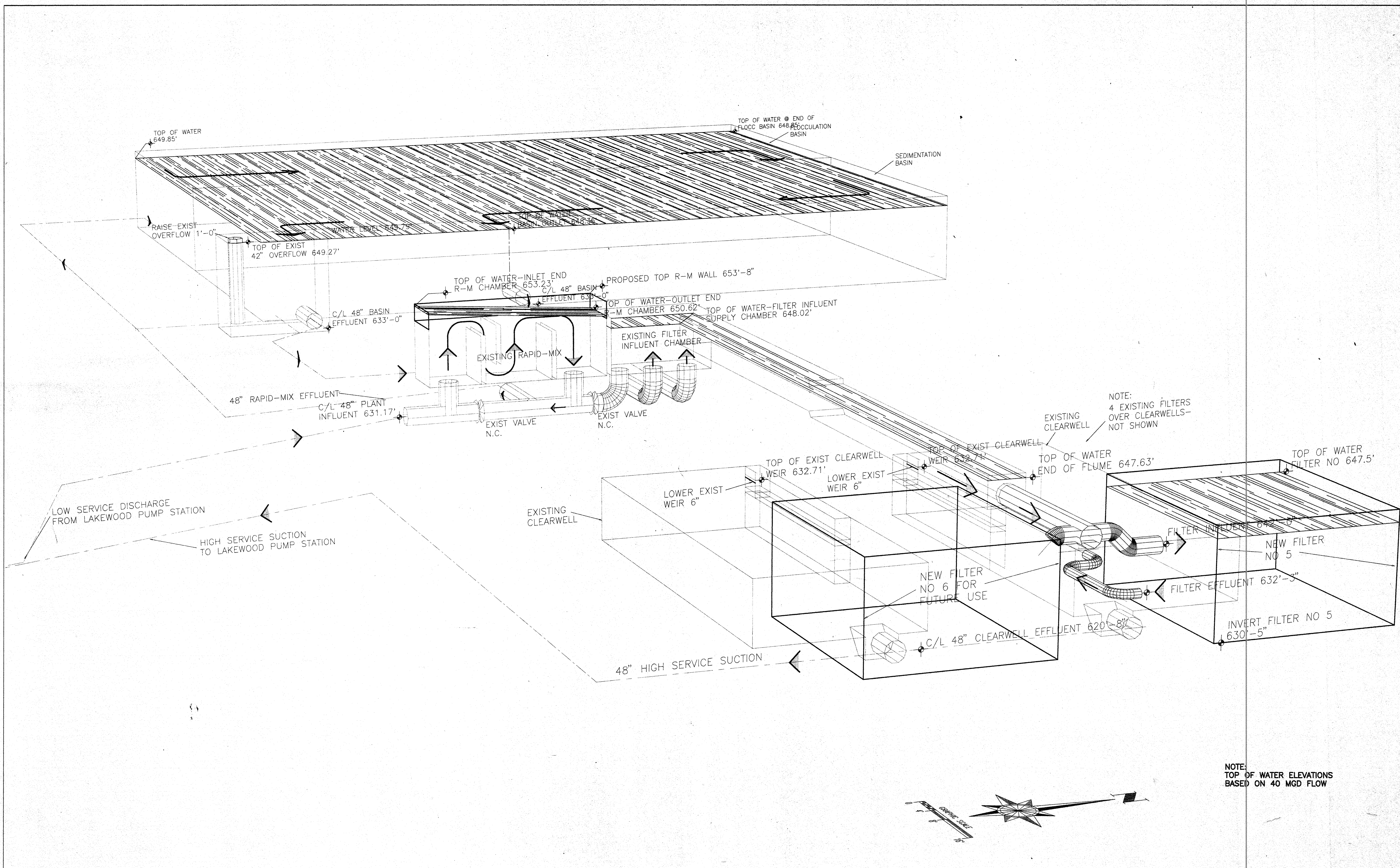
DRAWN	DATE
ECG	26 FEB 76
COORDINATOR	DATE
D. RIDINGS	26 FEB 76
CHECKED	DATE
APPROVED	DATE

*DULUTH W.T.P.  
DULUTH, MINNESOTA*

**MIXED-MEDIA  
DESIGN**

DRAWING No	REV
P5144-1	
SHEET	OF

**C**  
EM-16



HYDRAULIC PROFILE

NOTE:  
TOP OF WATER ELEVATIONS  
BASED ON 40 MGD FLOW

RECORD DWG.

filename: 9128FLOW  
plot view: 2  
sheet: 1 of 1  
xref: NONE

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of Minnesota.

DESIGNED BY	WJG
DRAWN BY	RWM
CHECKED BY	WJG
SURVEYED BY	RREM
SCALE	NONE

408 BOARD OF TRADE BUILDING  
DULUTH, MINNESOTA 55802

**PREM, INC.**  
CONSULTING ENGINEERS

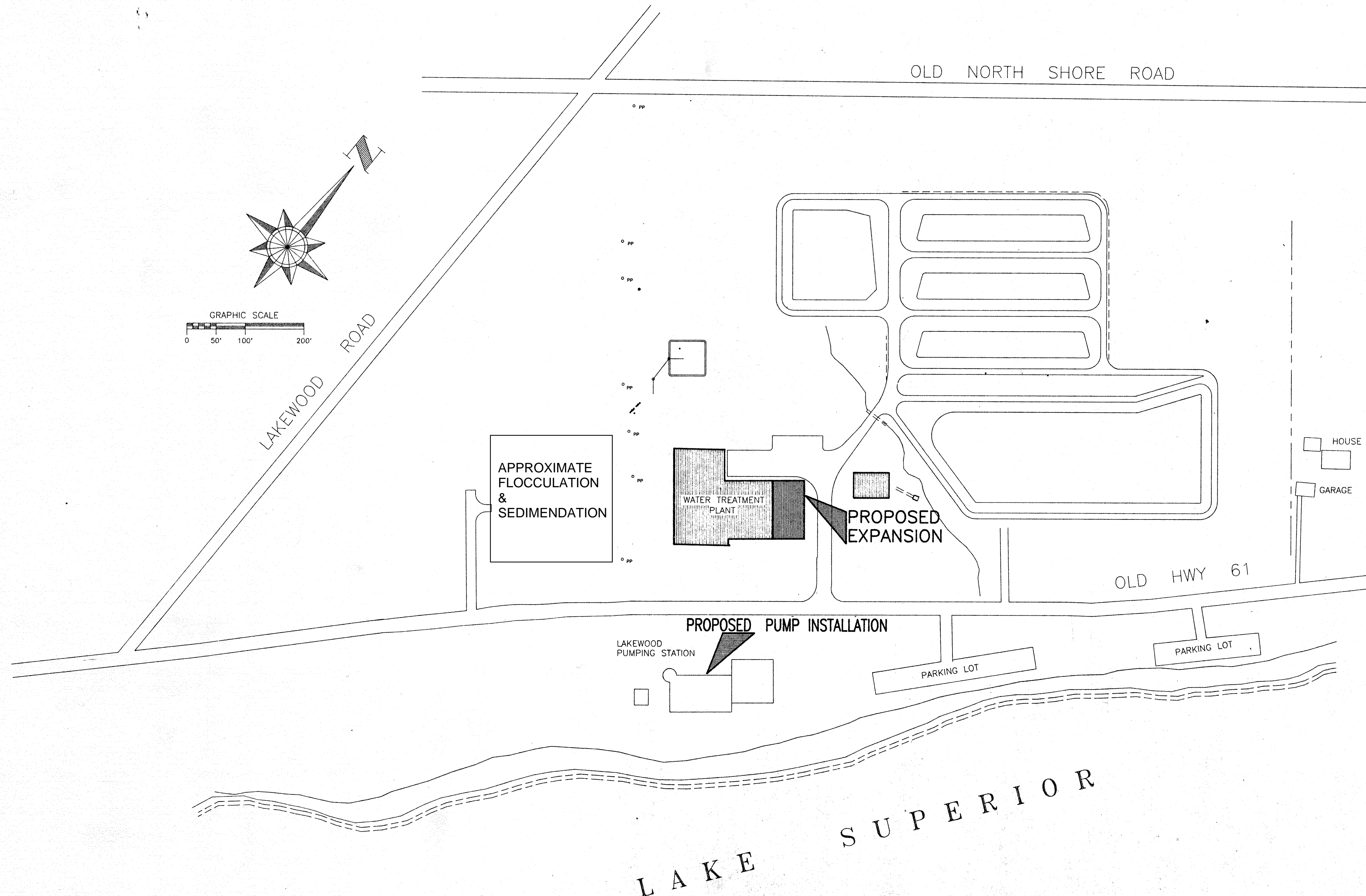
NO.	DESCRIPTION	DATE

DULUTH WATER  
TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA  
HYDRAULIC PROFILE

DATE	AUGUST '91
W.D. No.	9126
SHEET NO.	21
OF	46

# WATER TREATMENT PLANT EXPANSION DULUTH, MINNESOTA

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I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER OR ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

*Wesley J. Hallgren*  
 CIVIL ENGINEER  
 DATE 8/16/91 REG. No. 9948

*David A. Reinhold*  
 CIVIL ENGINEER  
 DATE 8/19/91 REG. No. 8164

*James K. Johnson*  
 MECHANICAL ENGINEER  
 DATE 8/14/91 REG. No. 15920

*David A. Reinhold*  
 ELECTRICAL ENGINEER  
 DATE 8-14-91 REG. No. 6427

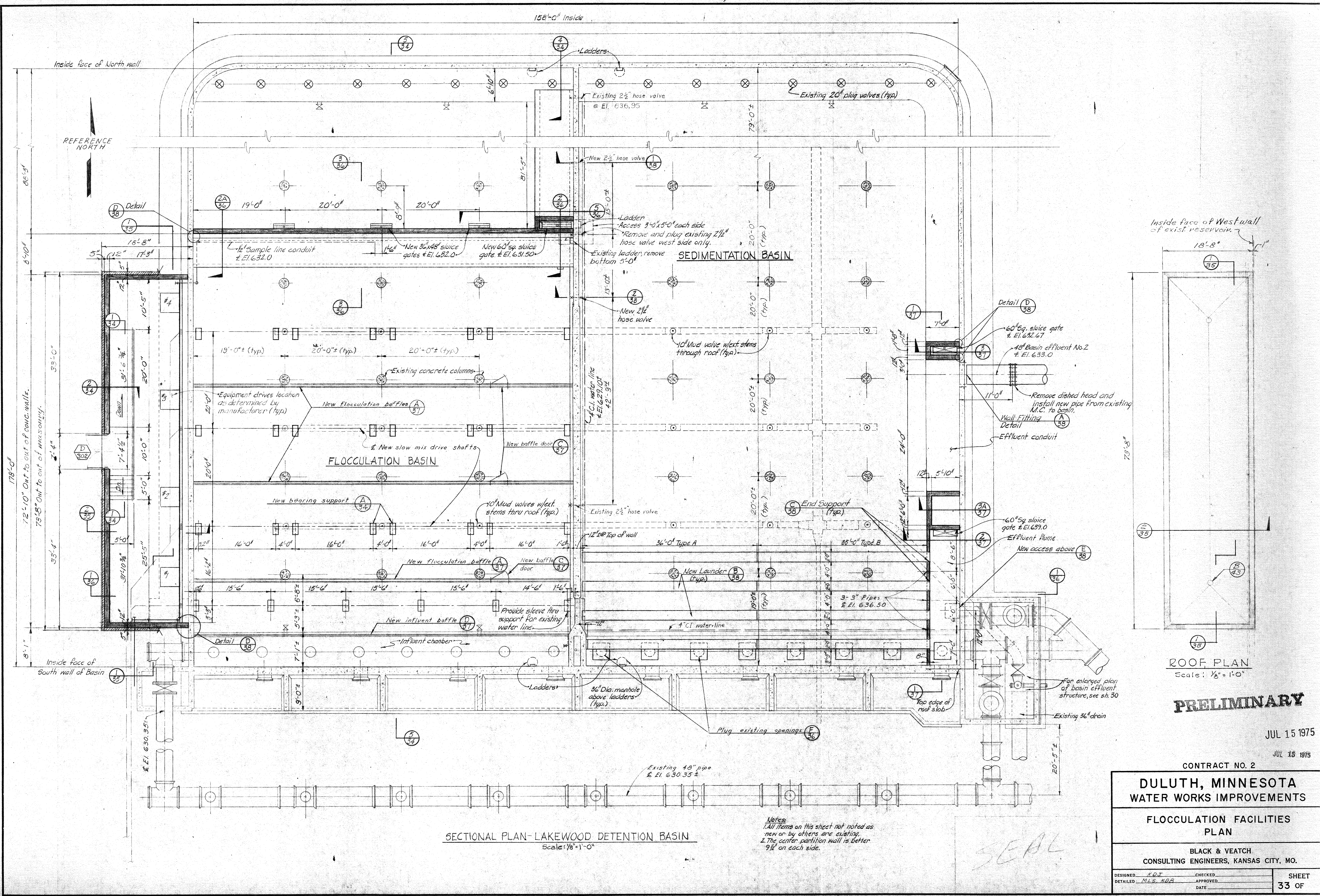
*David A. Reinhold*  
 ARCHITECT  
 DATE 8-14-91 REG. No. 16871

RECORD DRAWING

**CITY OF DULUTH  
WATER and GAS DEPARTMENT**

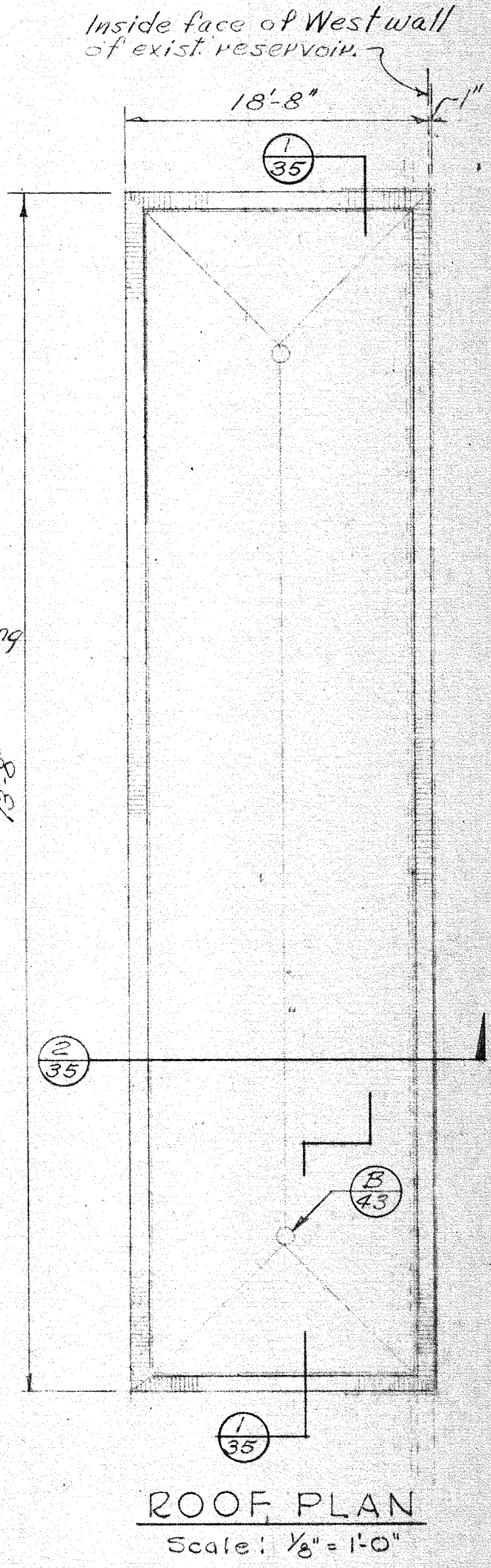
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly registered professional engineer or architect under the laws of the state of Minnesota.		DESIGNED BY WJG	DRAWN BY RJB	CHECKED BY WJG	SURVEYED BY RREM	SCALE: AS NOTED	DATE	FIG. NO.
In Collaboration With: <b>MELANDER MELANDER &amp; SCHILLING ARCHITECTS</b> FOSTER JACOBS & JOHNSON, INC.		408 BOARD OF TRADE BUILDING DULUTH, MINNESOTA 55802		<b>PREM, INC.</b> CONSULTING ENGINEERS		REVISIONS NO. DESCRIPTION DATE		
DATE	AUGUST, '91	DULUTH WATER TREATMENT PLANT EXPANSION		DULUTH, MINNESOTA		TITLE SHEET		
W.O. No.	9126	SHEET NO.	1	OF		46		

filename: 91261  
 plot scale: 1=100  
 xref: NONE



SECTIONAL PLAN-LAKWOOD DETENTION BASIN  
Scale: 1/8" = 1'-0"

Notes:  
1. All items on this sheet not noted as new or by others are existing.  
2. The center partition wall is better 9 1/2" on each side.



ROOF PLAN  
Scale: 1/8" = 1'-0"

**PRELIMINARY**

JUL 15 1975

JUL 15 1975

CONTRACT NO. 2

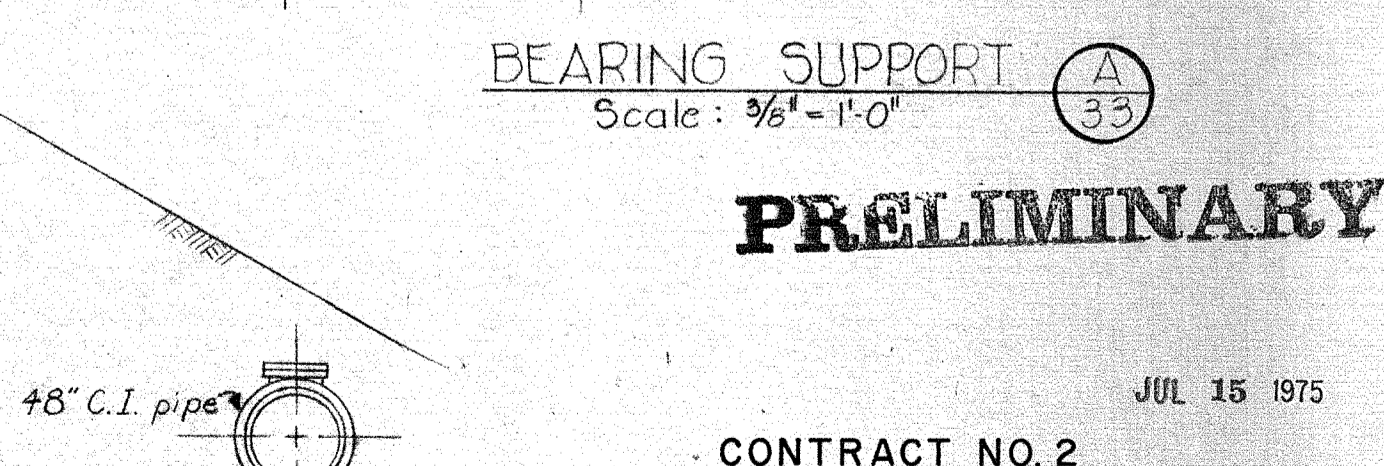
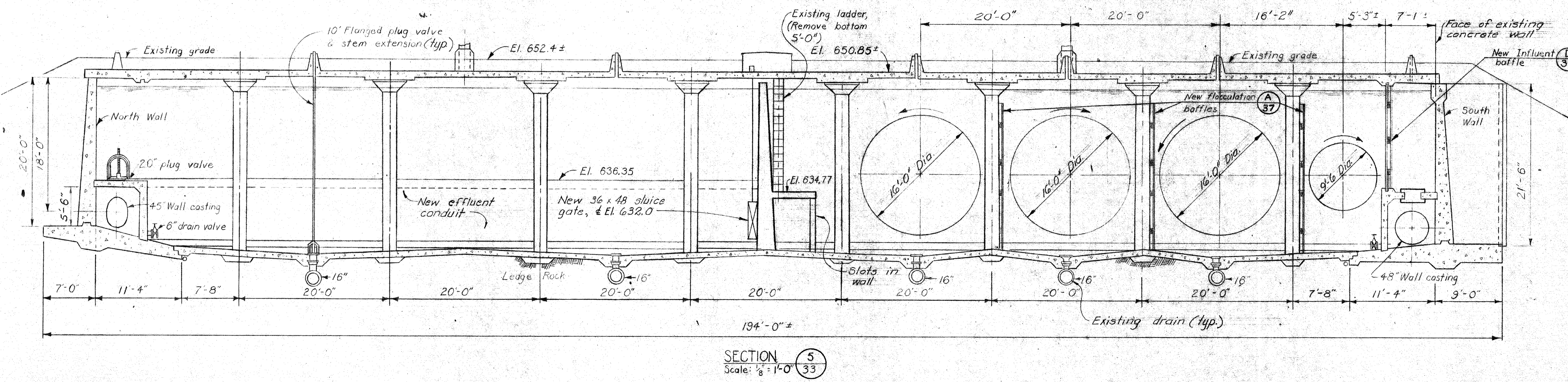
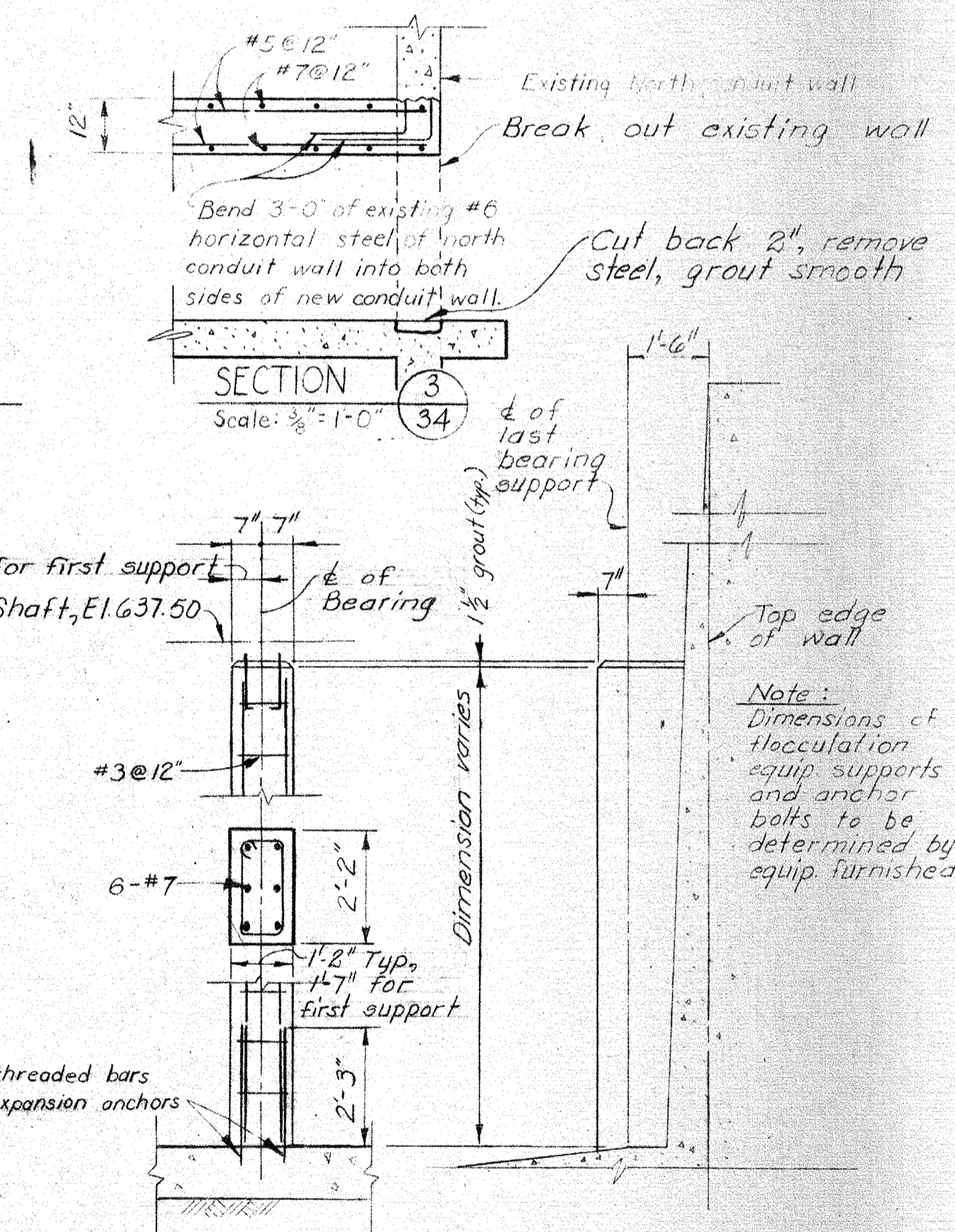
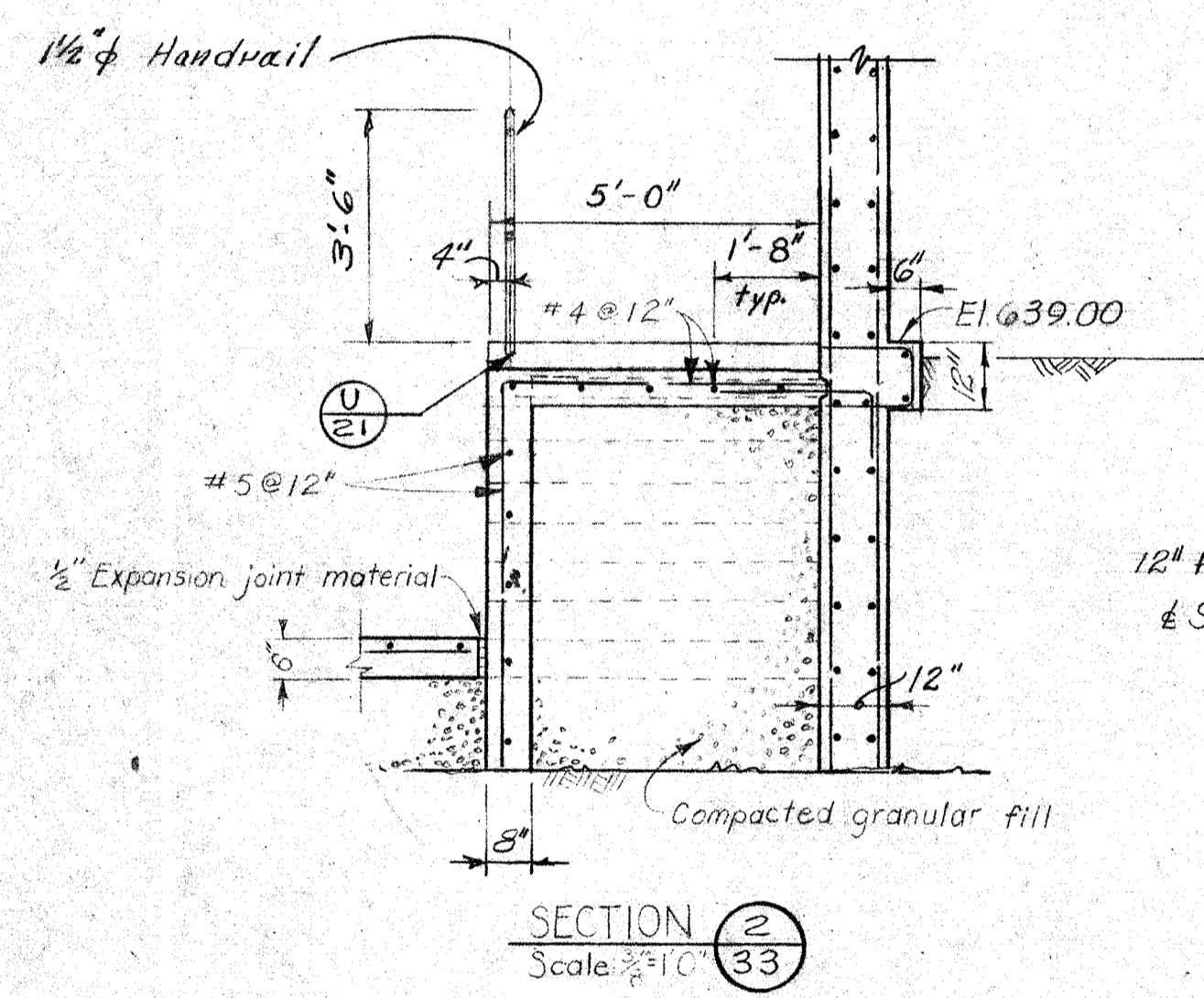
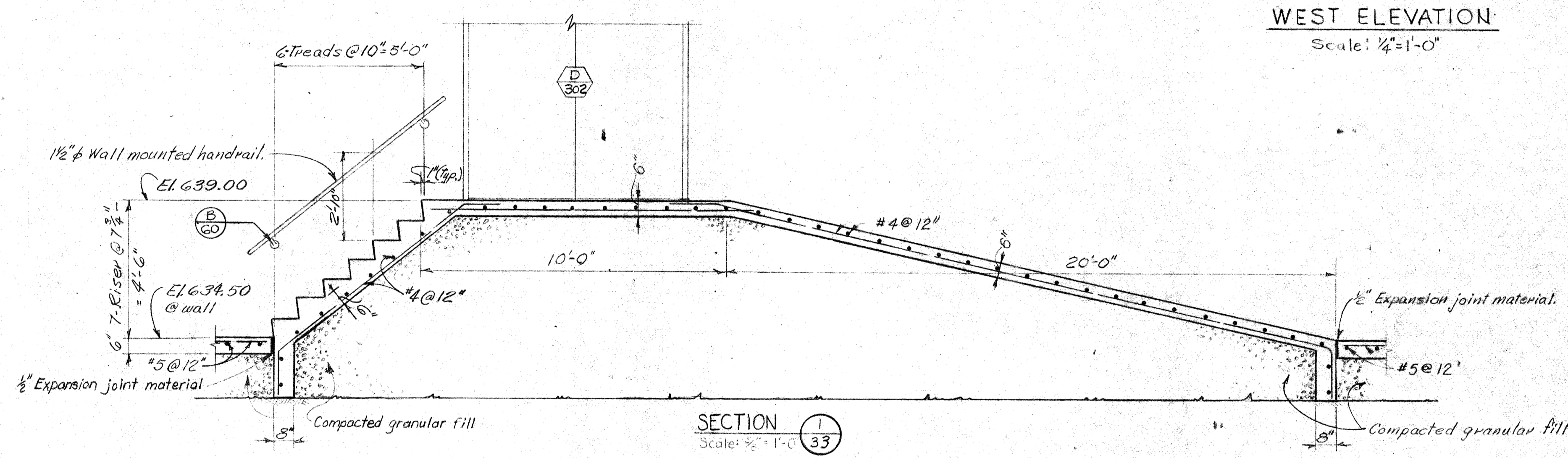
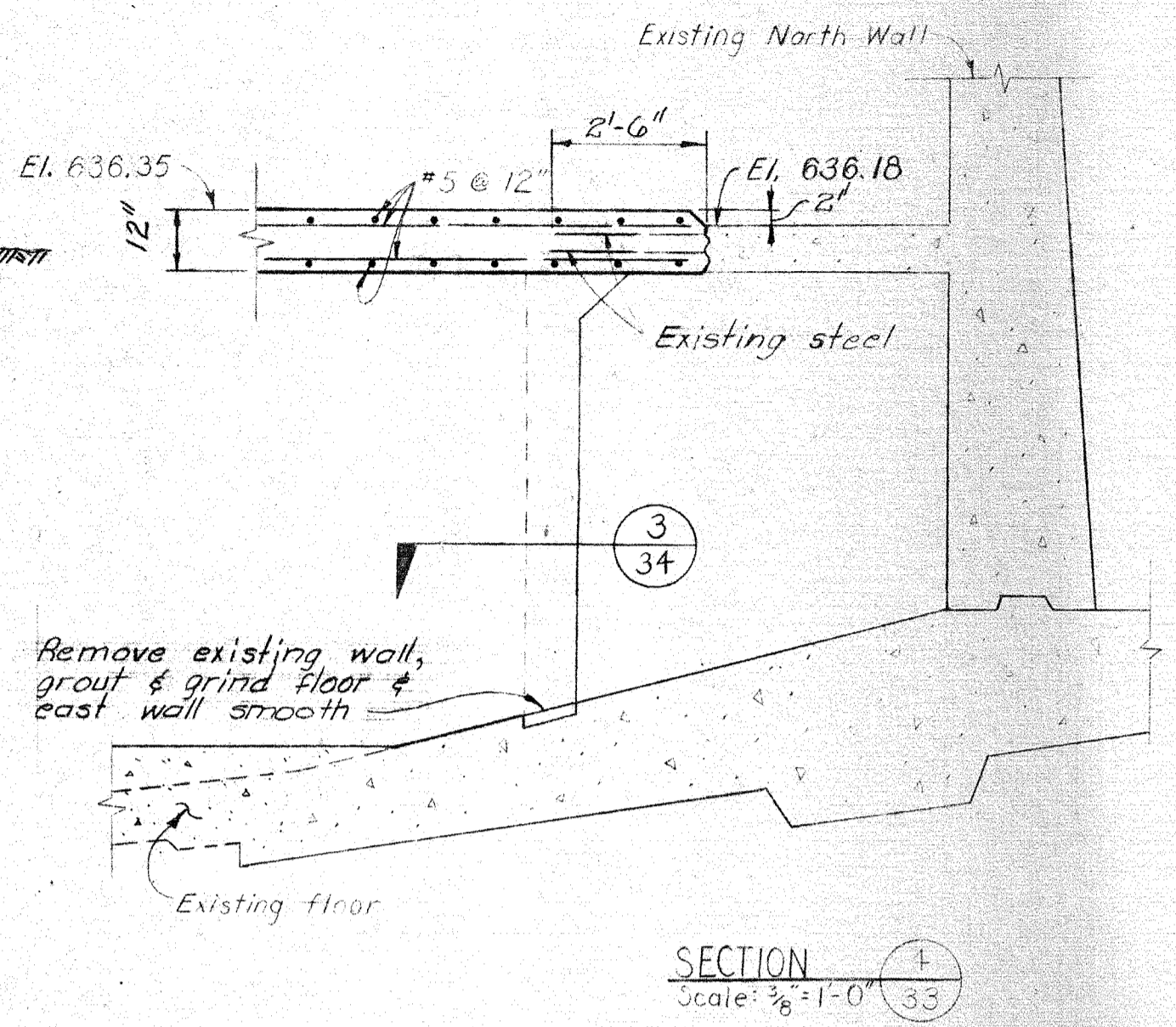
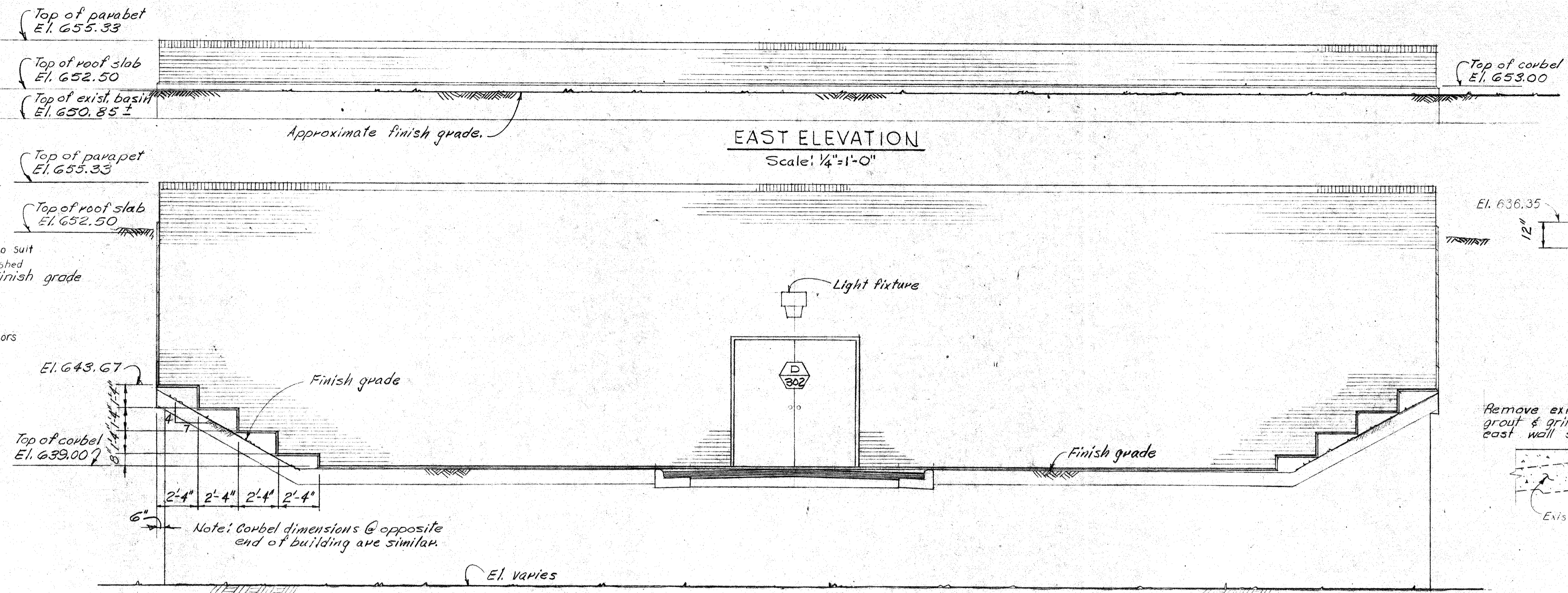
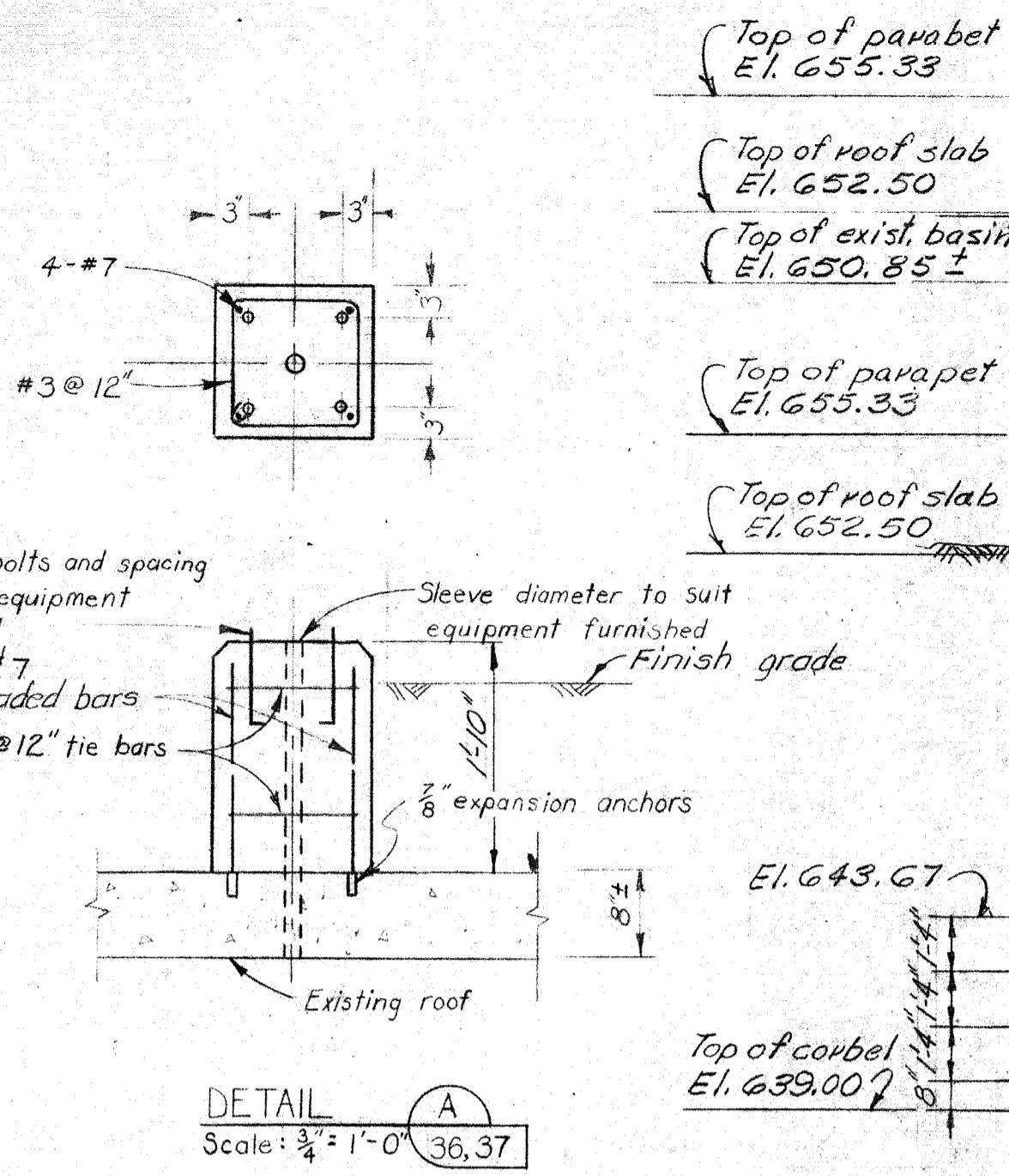
**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

**FLOCCULATION FACILITIES  
PLAN**

**BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.**

DESIGNED KDJ	CHECKED MLK	APPROVED DATE	SHEET 33 OF
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SEAL



**PRELIMINARY**

JUL 15 1975

CONTRACT NO. 2

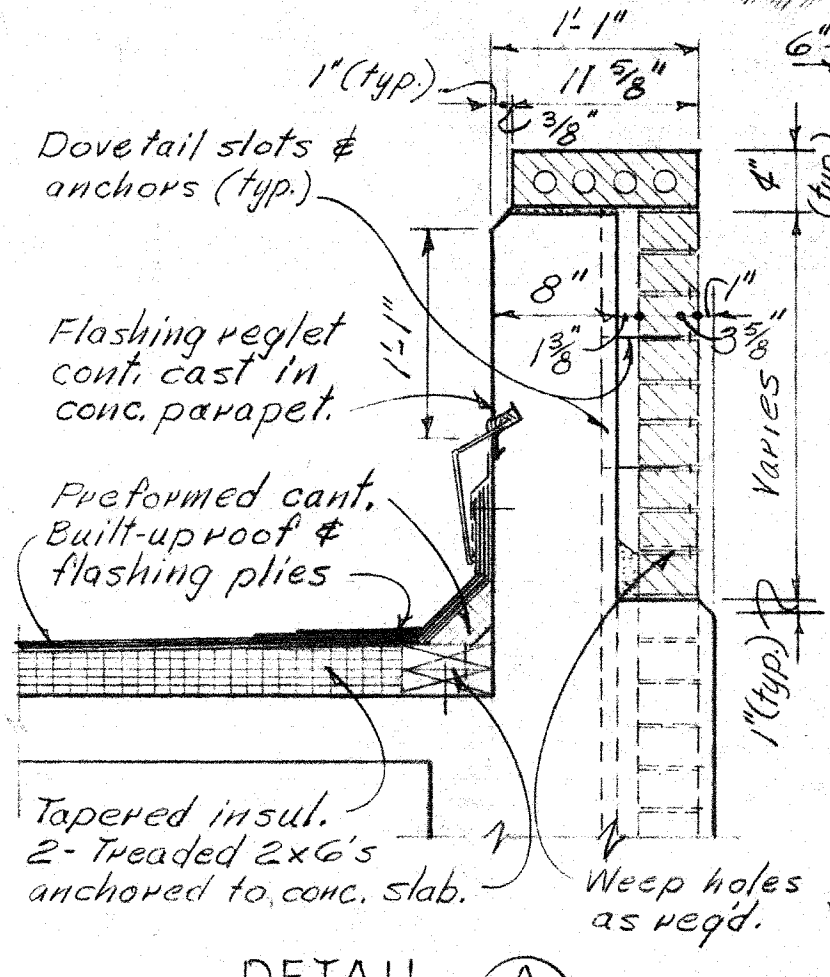
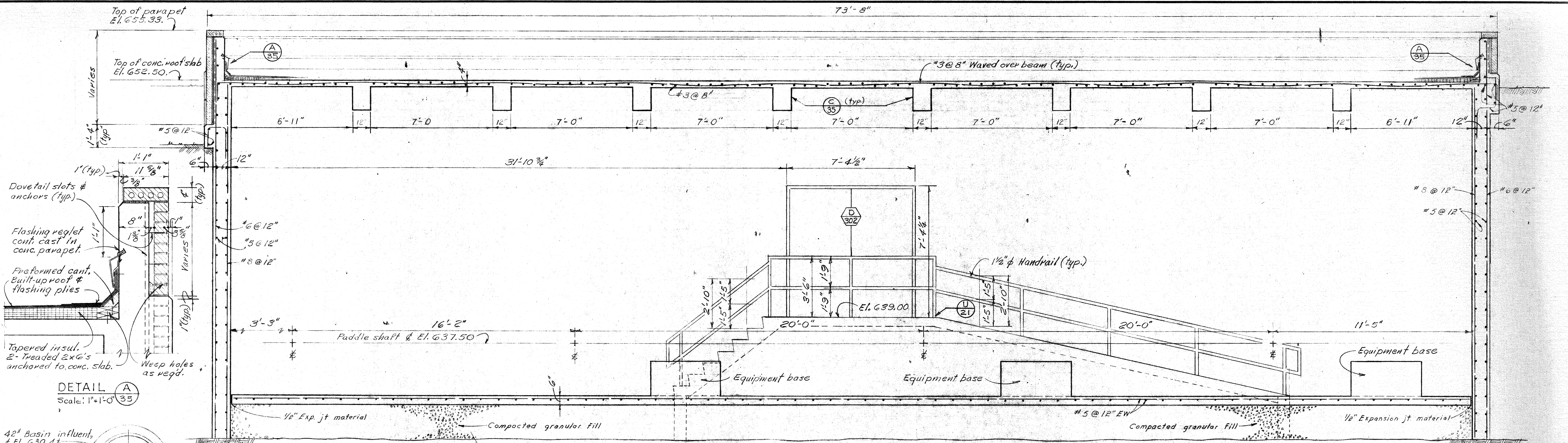
**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

**FLOCCULATION FACILITIES  
ELEVATIONS & SECTIONS**

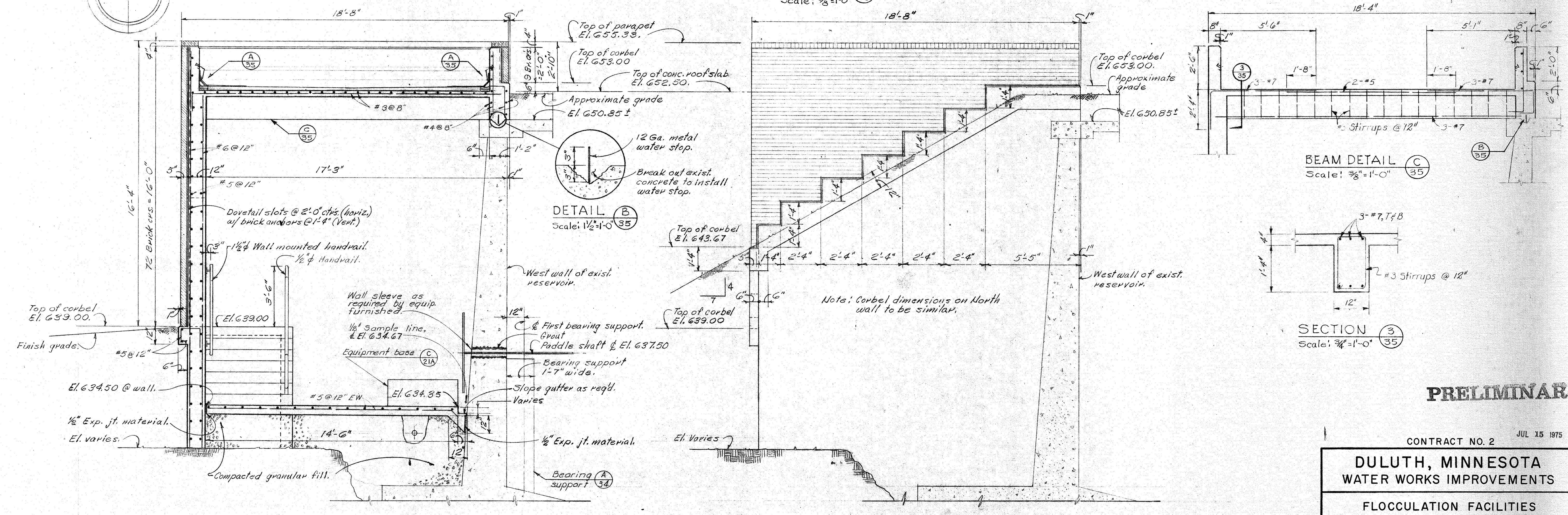
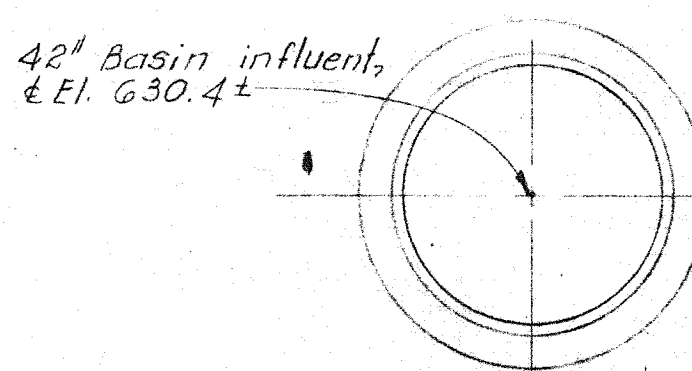
**BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.**

DESIGNED: K.D.J. K.S.B. R.M.B. CHECKED: \_\_\_\_\_  
 DETAILED: K.D.B. R.M.B. T.A.P. APPROVED: \_\_\_\_\_  
 DATE: \_\_\_\_\_

SHEET 34 OF



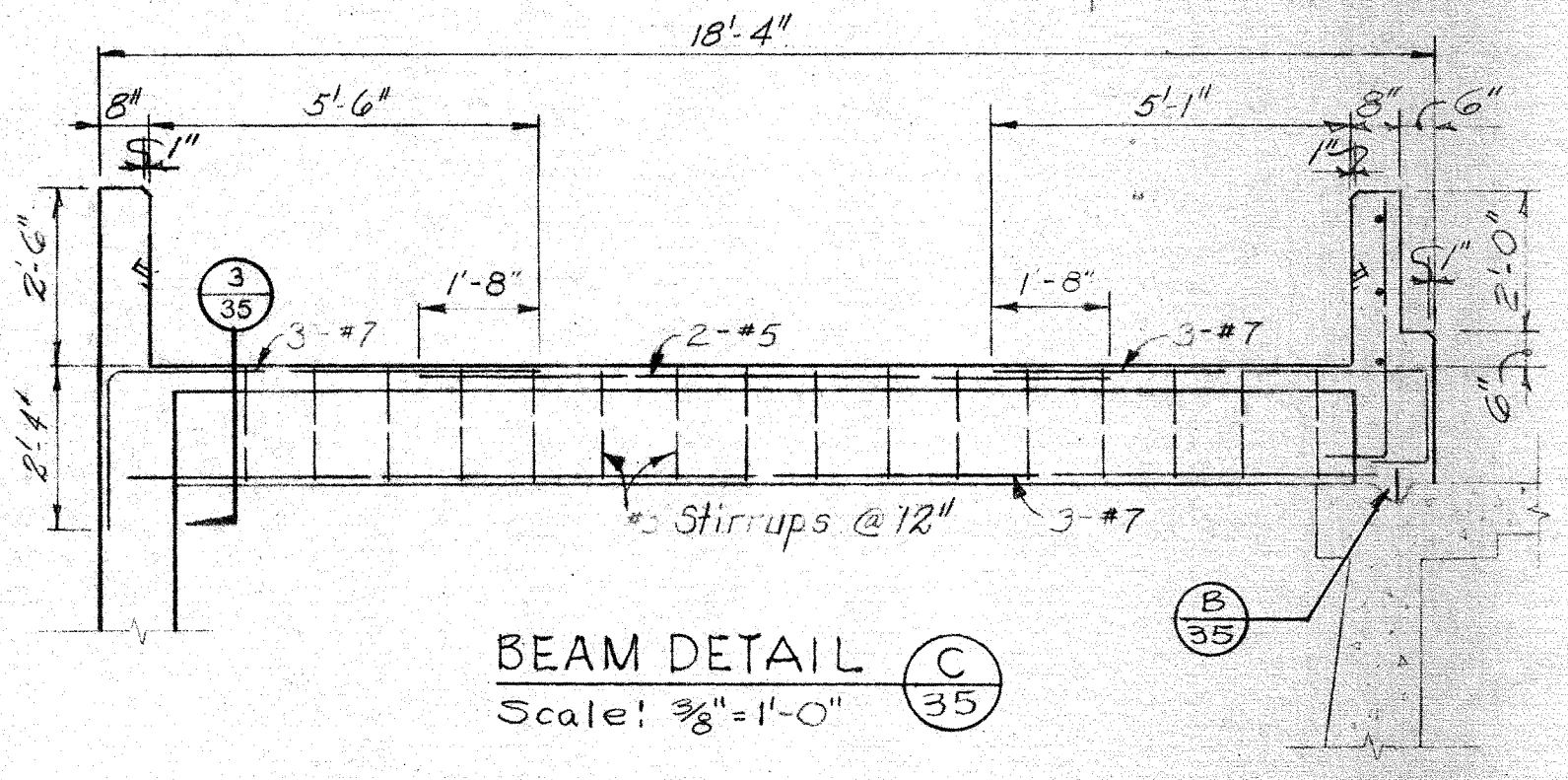
DETAIL A  
Scale: 1"=1'-0" (35)



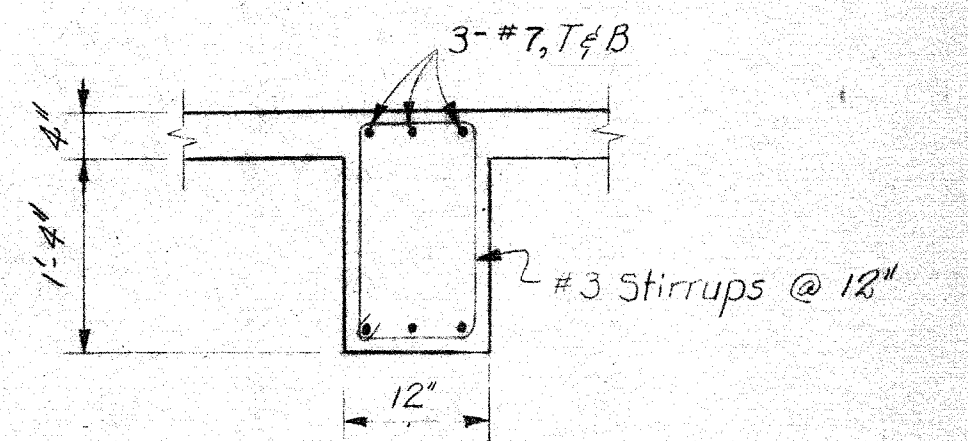
DETAIL B  
Scale: 1/2"=1'-0" (35)

SECTION 2  
Scale: 3/8"=1'-0" (33)

SECTION 1  
Scale: 3/8"=1'-0" (33)



BEAM DETAIL C  
Scale: 3/8"=1'-0" (35)



SECTION 3  
Scale: 3/4"=1'-0" (35)

NORTH & SOUTH ELEVATION  
Scale: 3/8"=1'-0"

South elevation shown.  
North elevation opposite hand.

**PRELIMINARY**

CONTRACT NO. 2 JUL 15 1975

**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

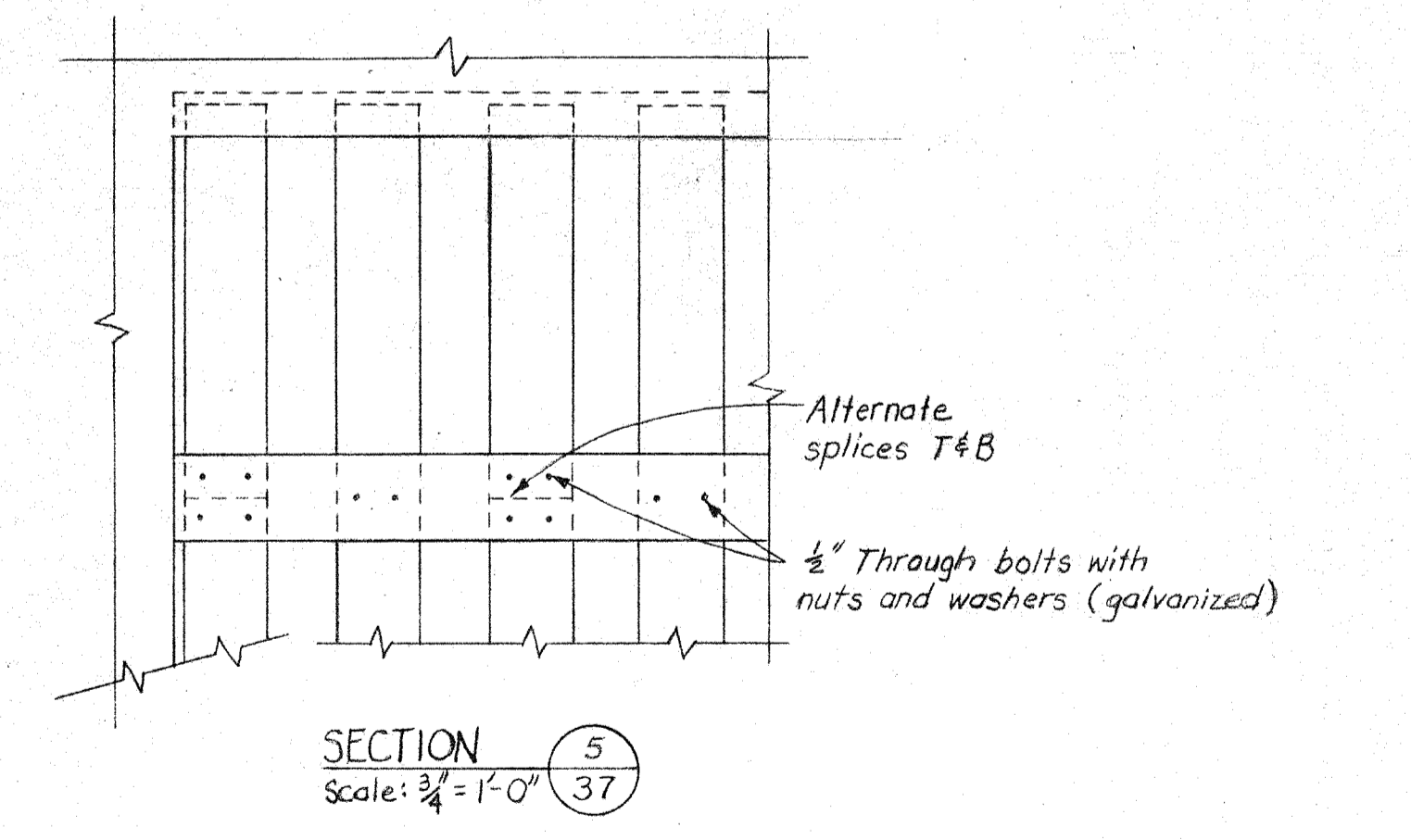
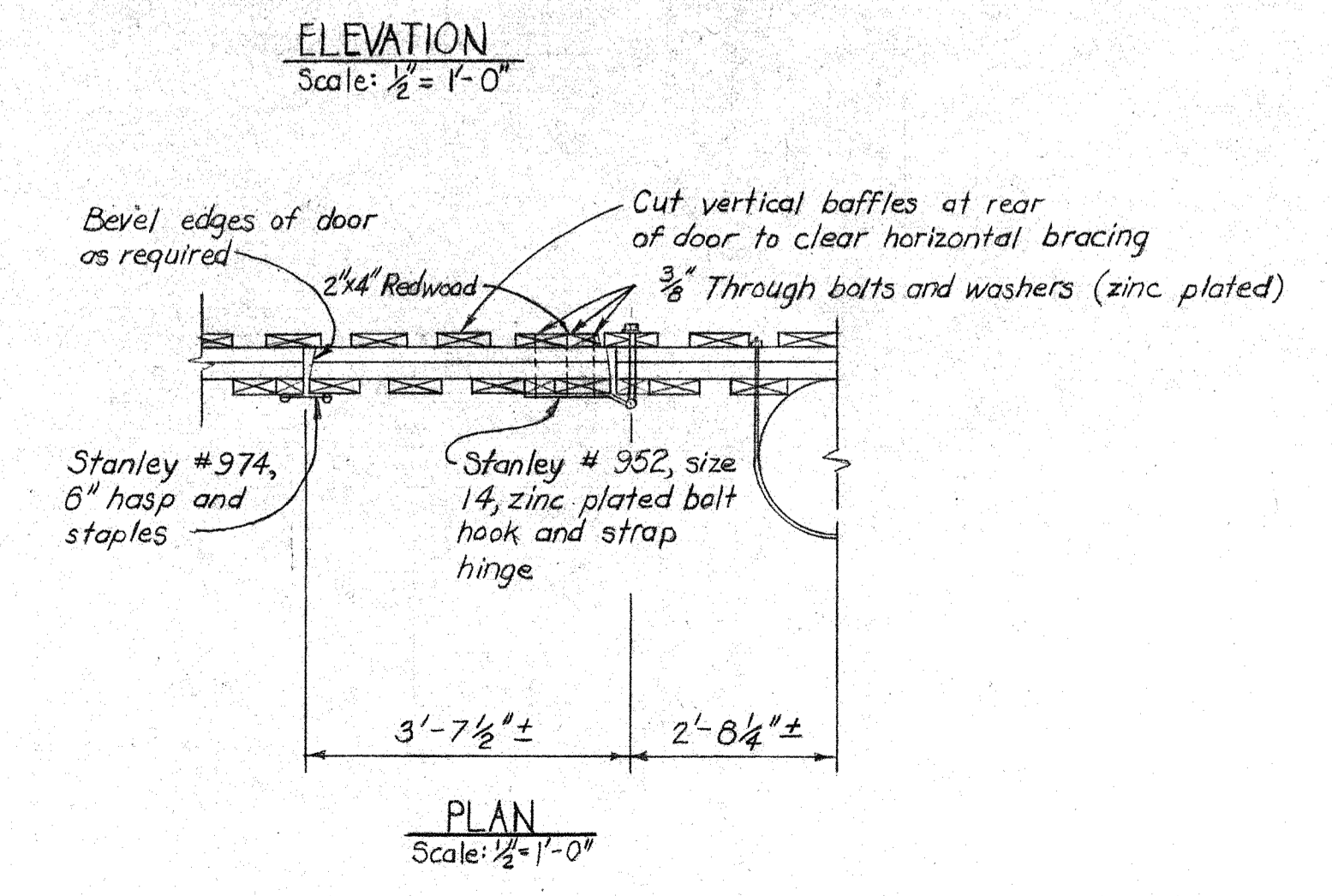
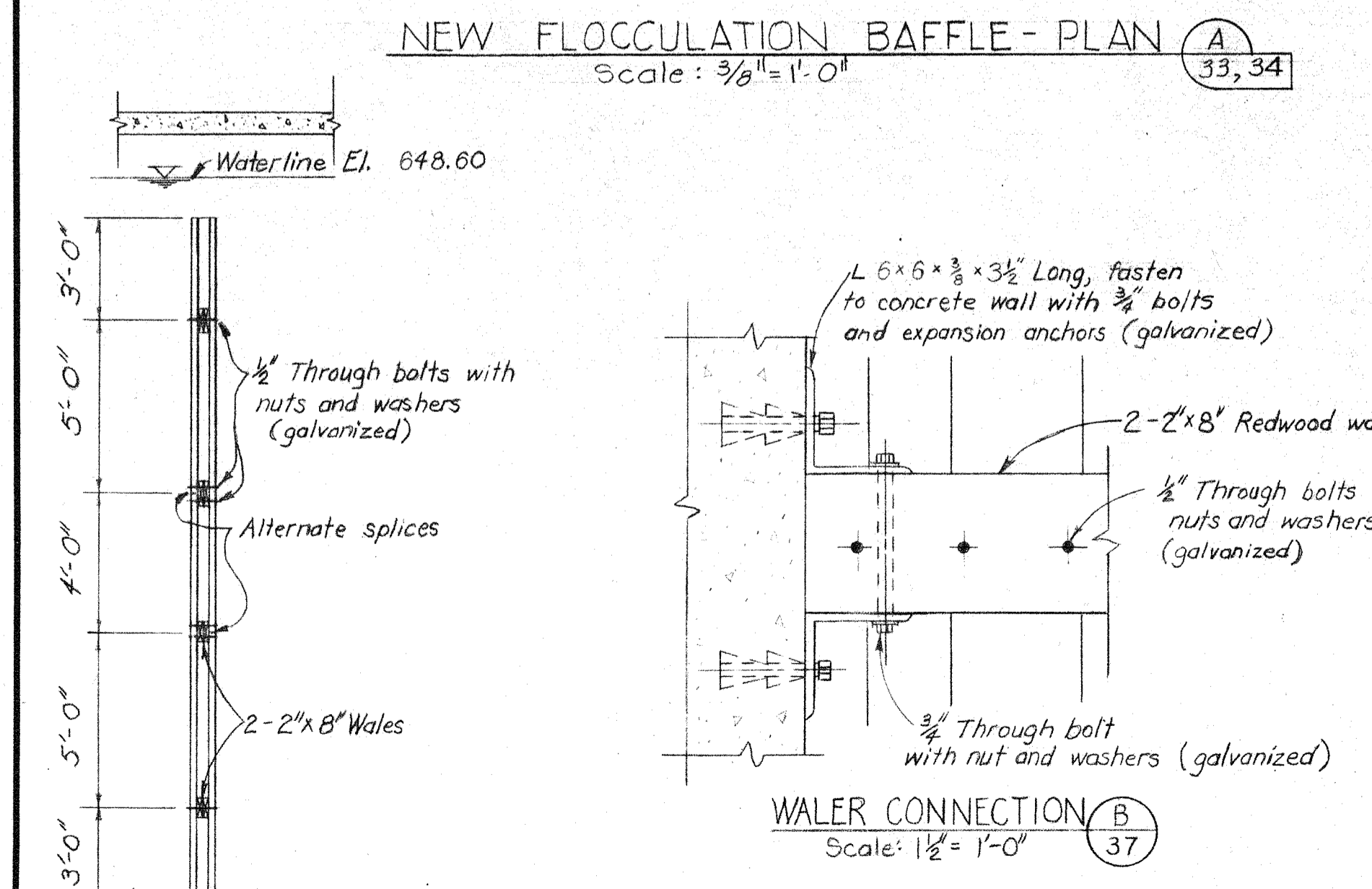
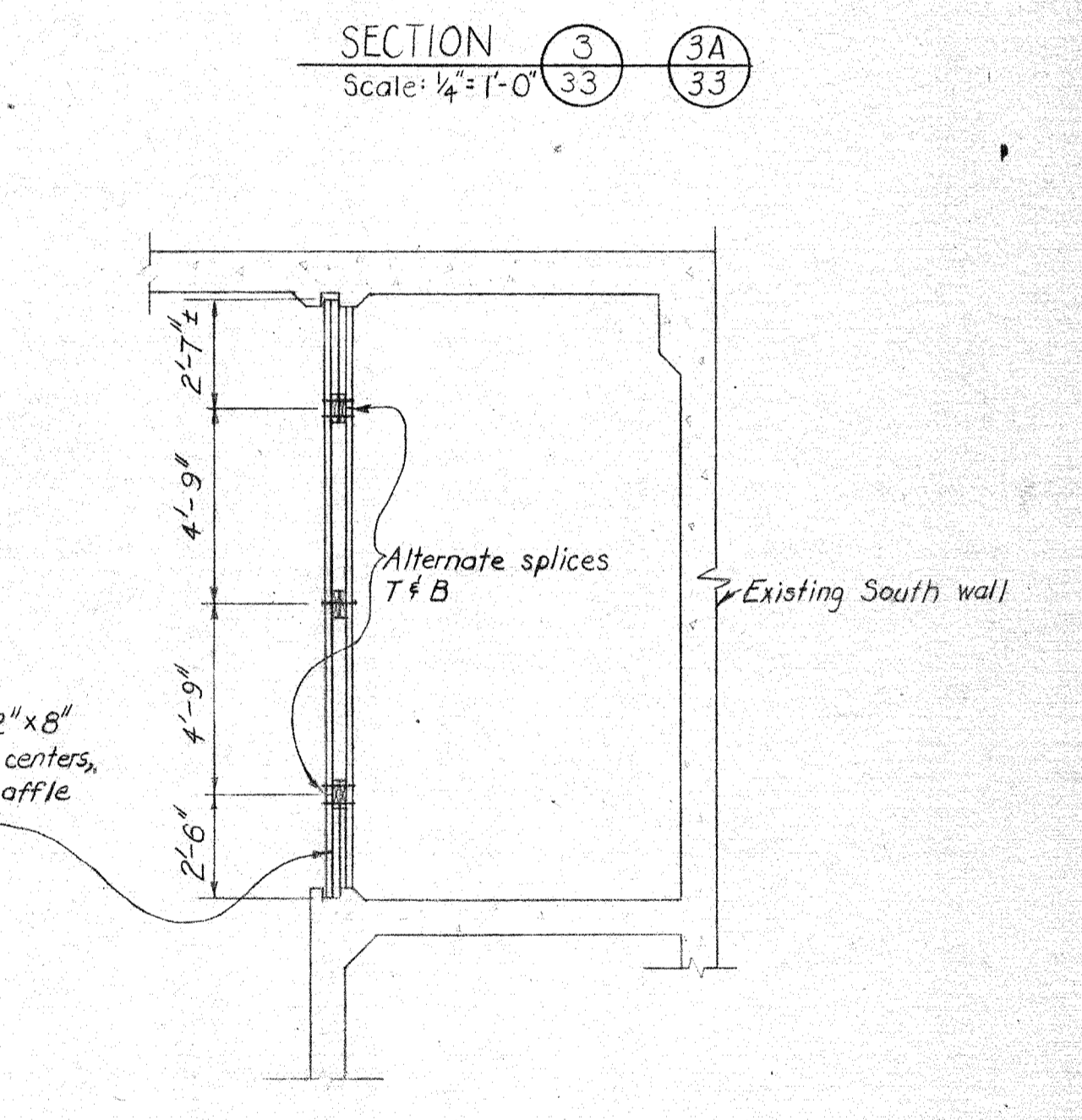
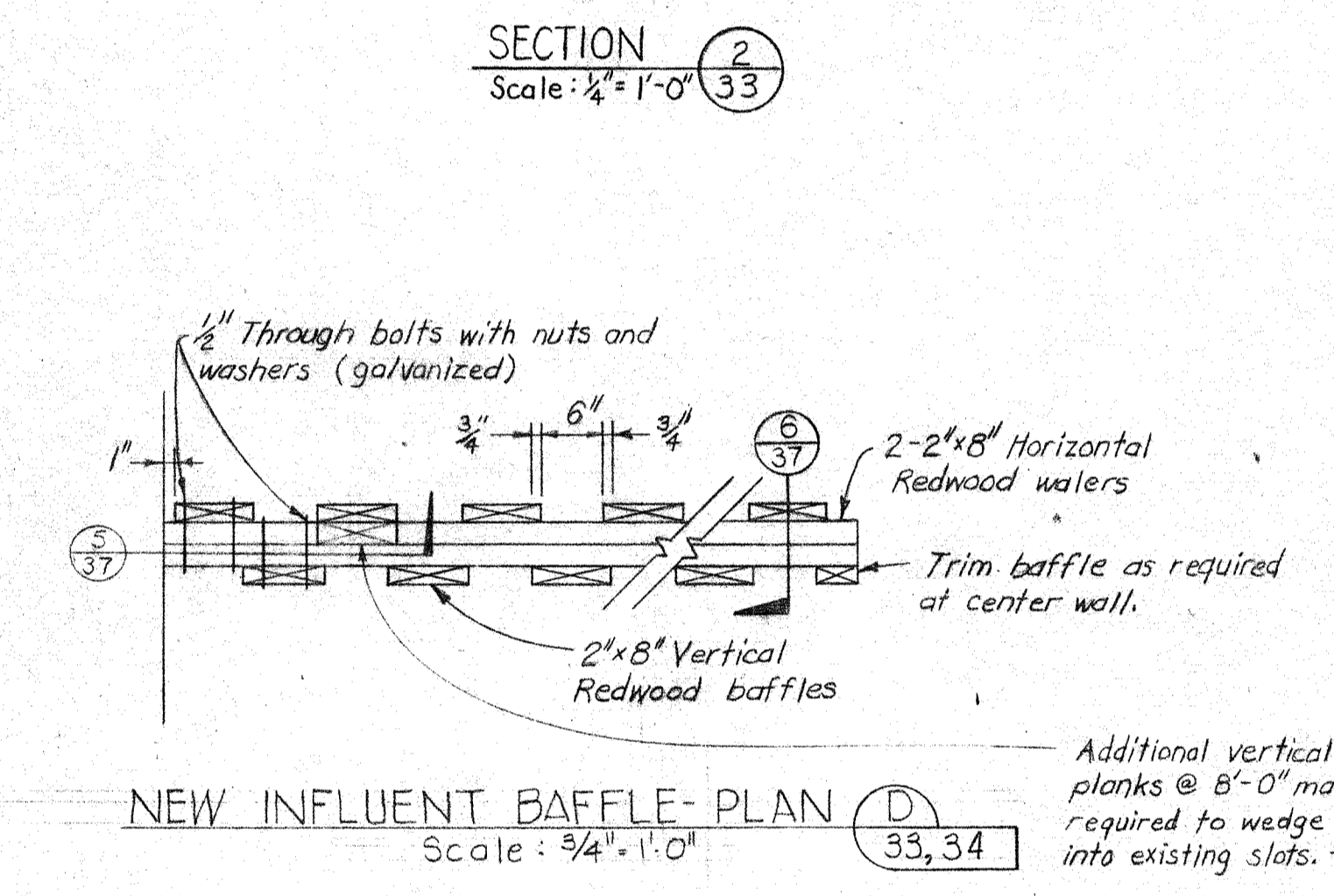
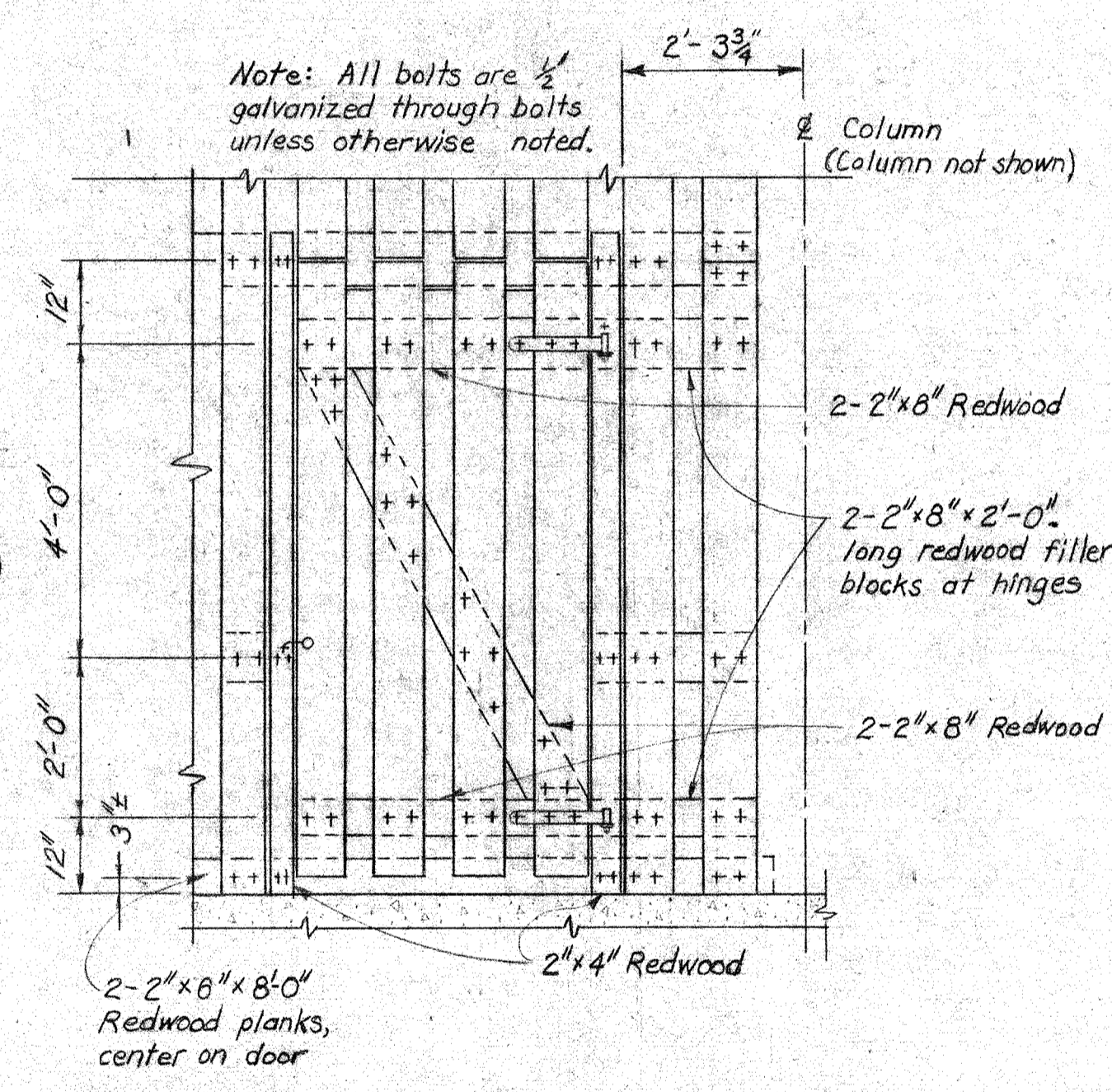
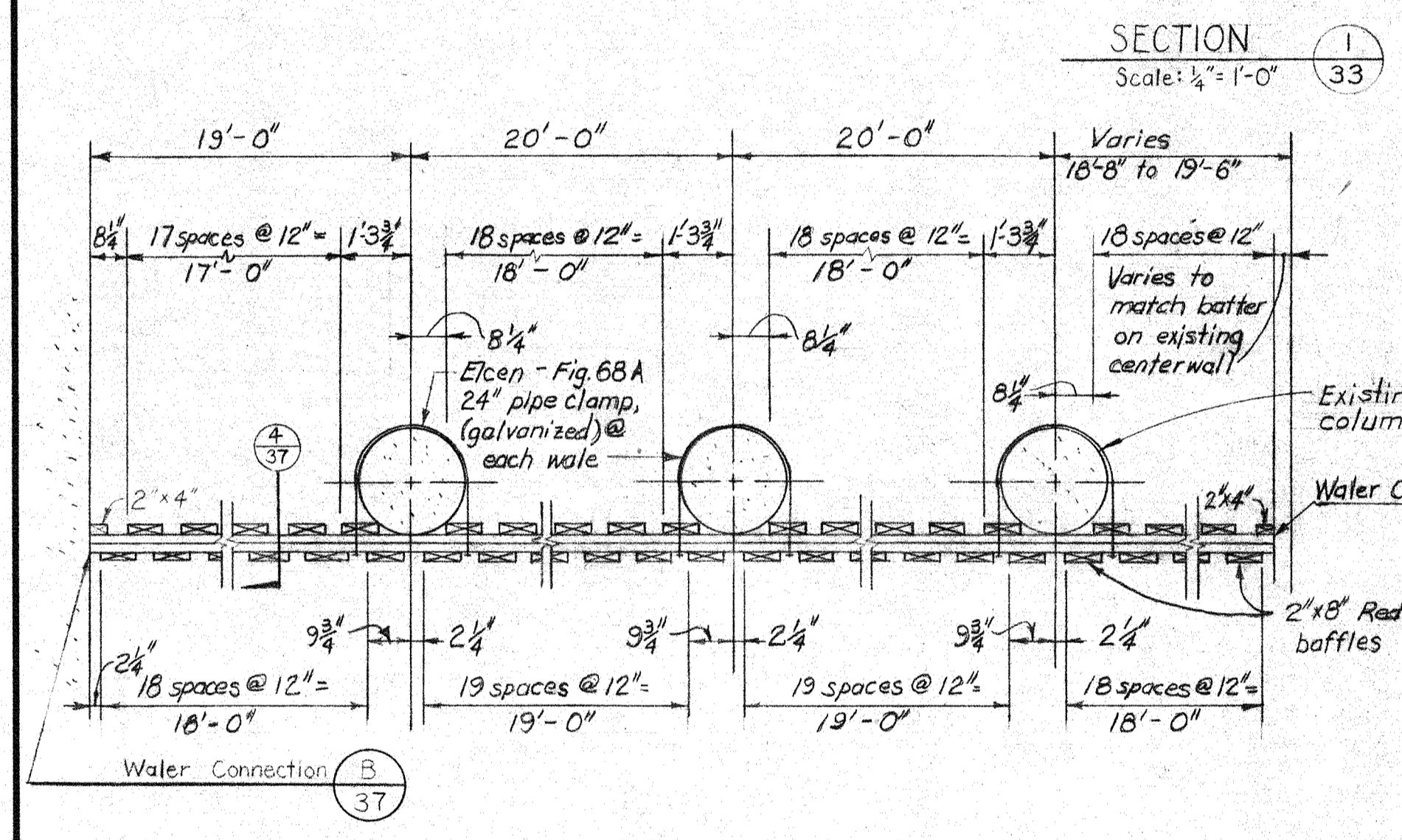
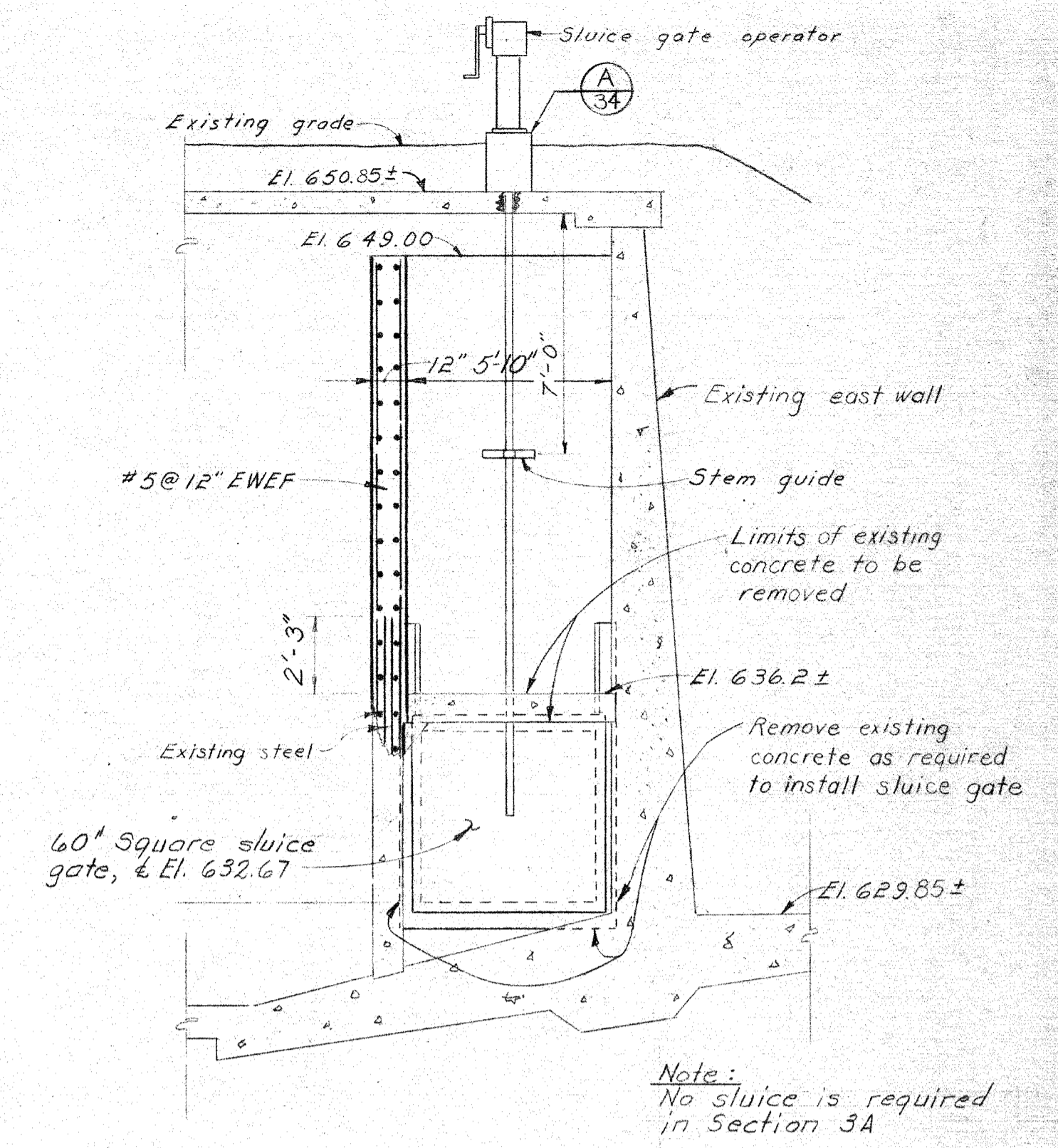
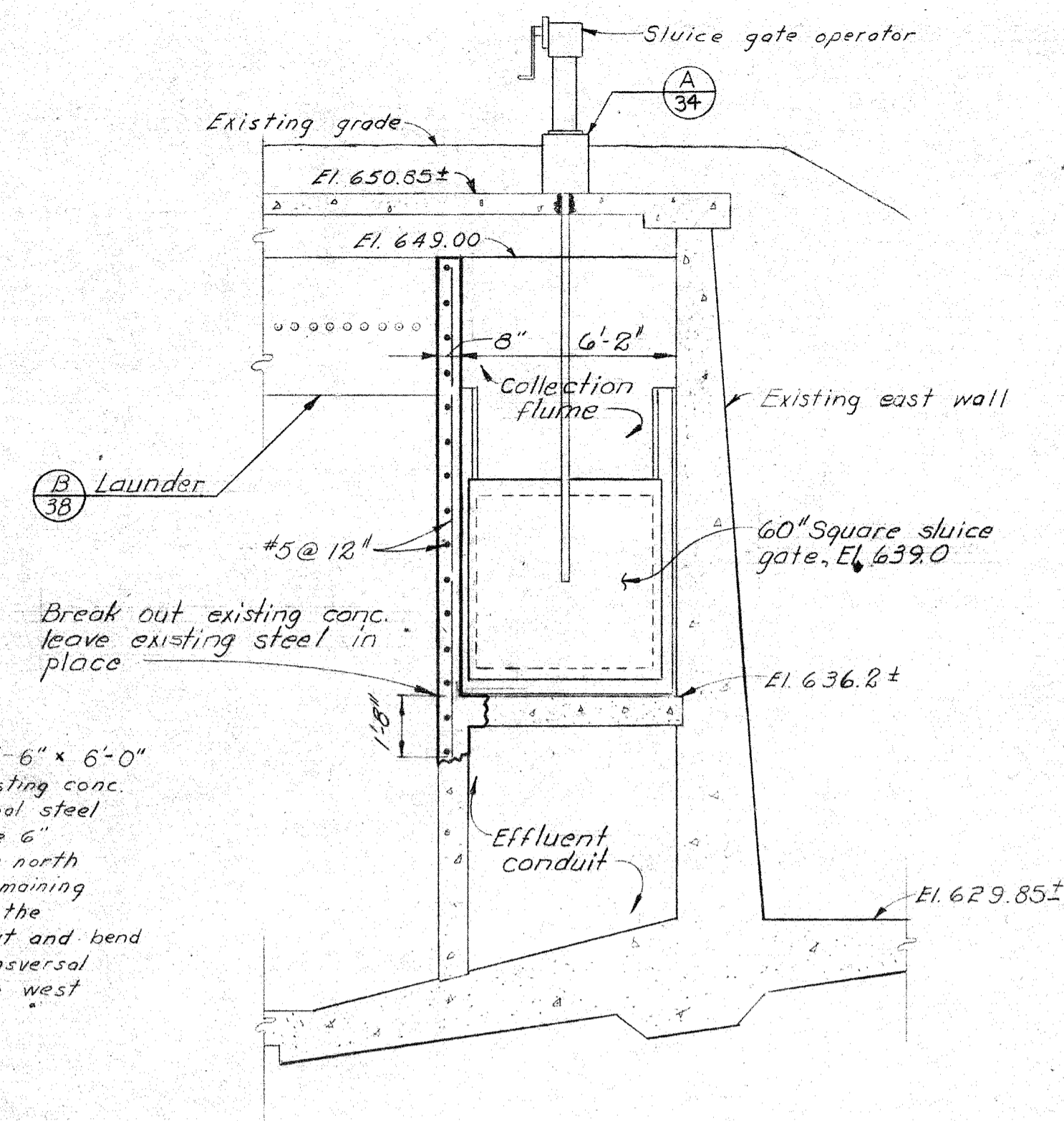
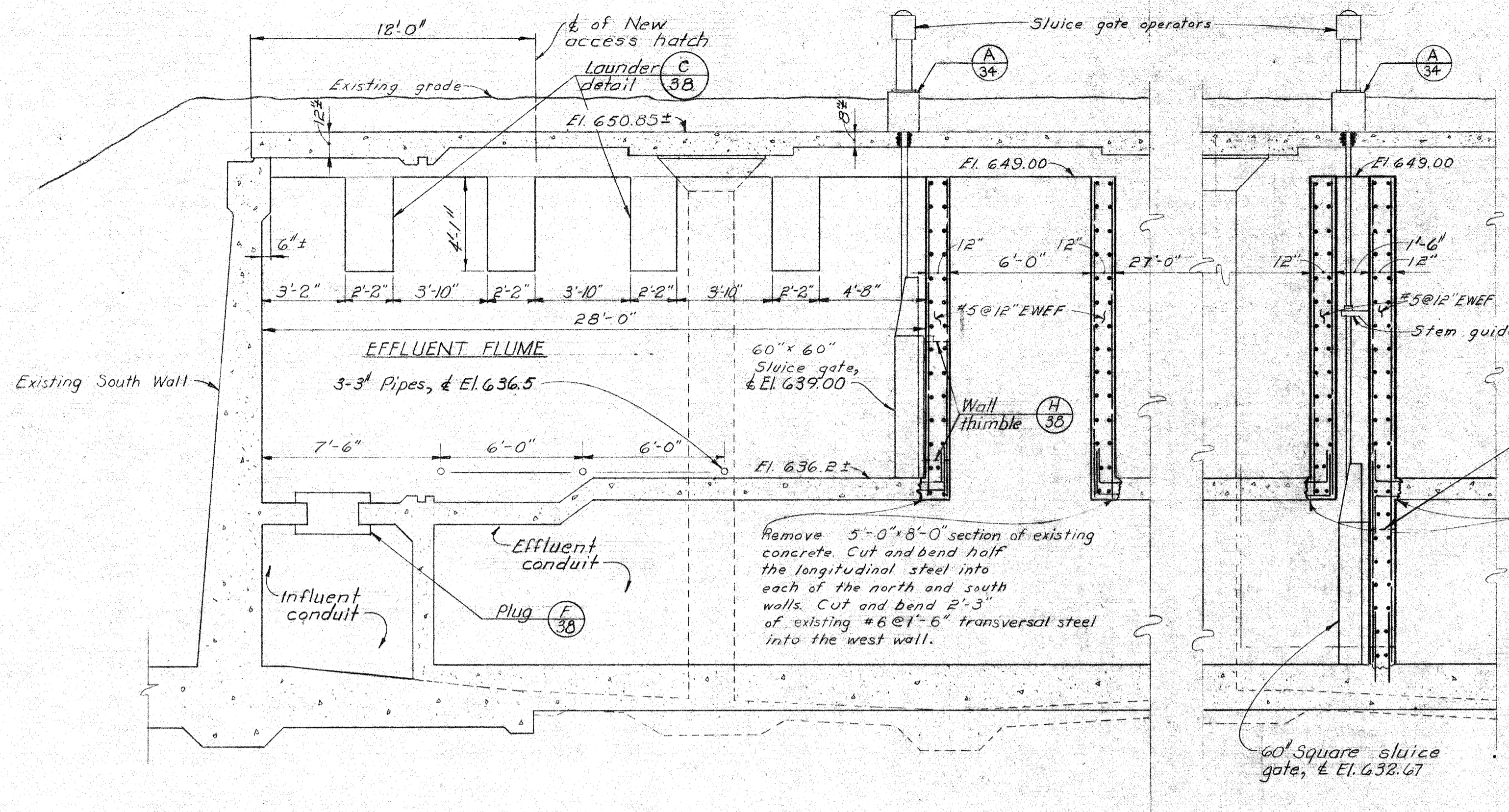
**FLOCCULATION FACILITIES  
ELEVATIONS & SECTIONS**

**BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.**

DESIGNED: KDJ, KDB, RMB CHECKED: \_\_\_\_\_  
 DETAILED: KDB, RMB, TAP APPROVED: \_\_\_\_\_  
 DATE: \_\_\_\_\_

SHEET  
35 OF 83





**PRELIMINARY**

CONTRACT NO. 2

**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

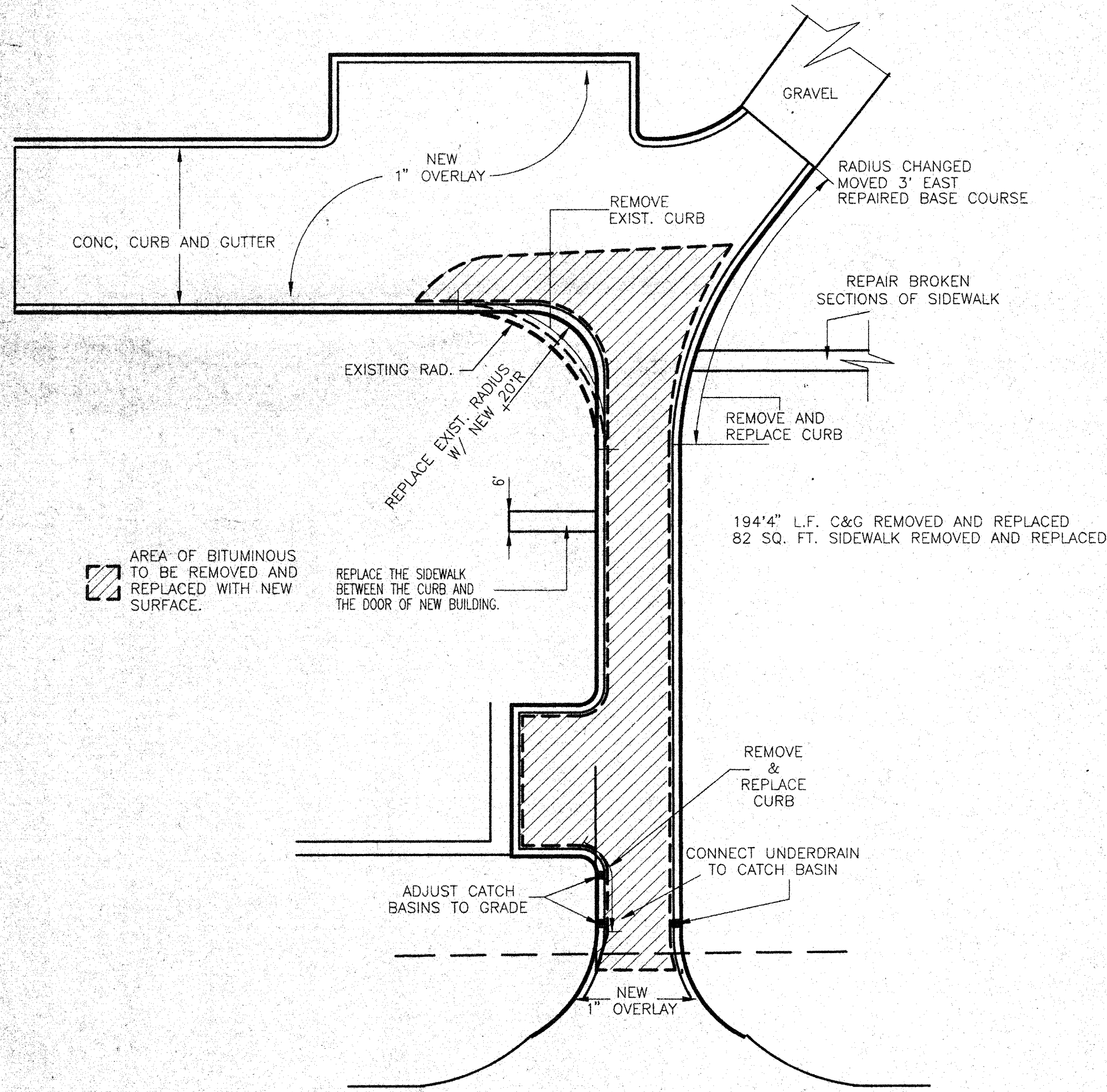
**FLOCCULATION FACILITIES  
SECTIONS & DETAILS**

**BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.**

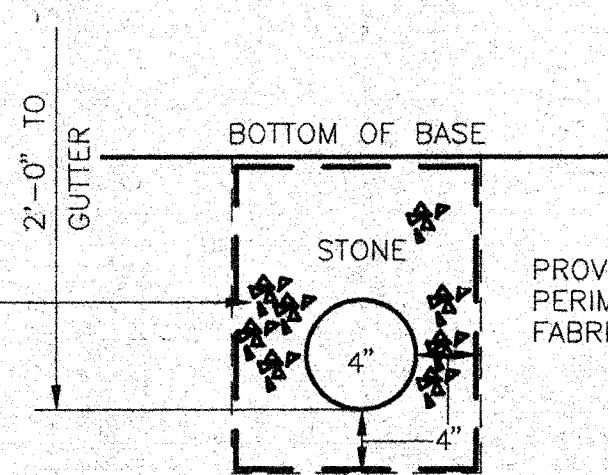
DESIGNED: KDJ, KDB CHECKED: KDB, RMB  
DATE: APPROVED: DATE: SHEET 37 OF

**NOTES:**

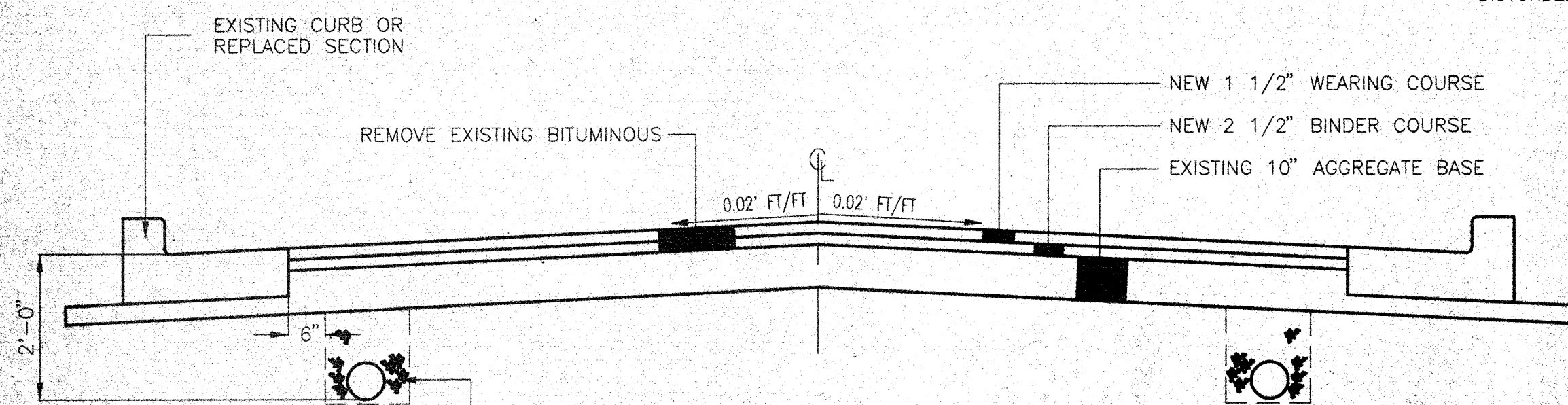
AREA BETWEEN BUILDING AND BACK OF CURB TO RECEIVE 4" TOP SOIL AND SOD  
 EXTEND EARTH BERM ALONG SOUTH SIDE OF FILTER BUILDING AS SHOWN  
 BUILDING ELEVATIONS, SLOPE BERM AT 3:1 TO EXISTING GROUND, APPLY  
 4" TOPSOIL AND SOD (STAKED)



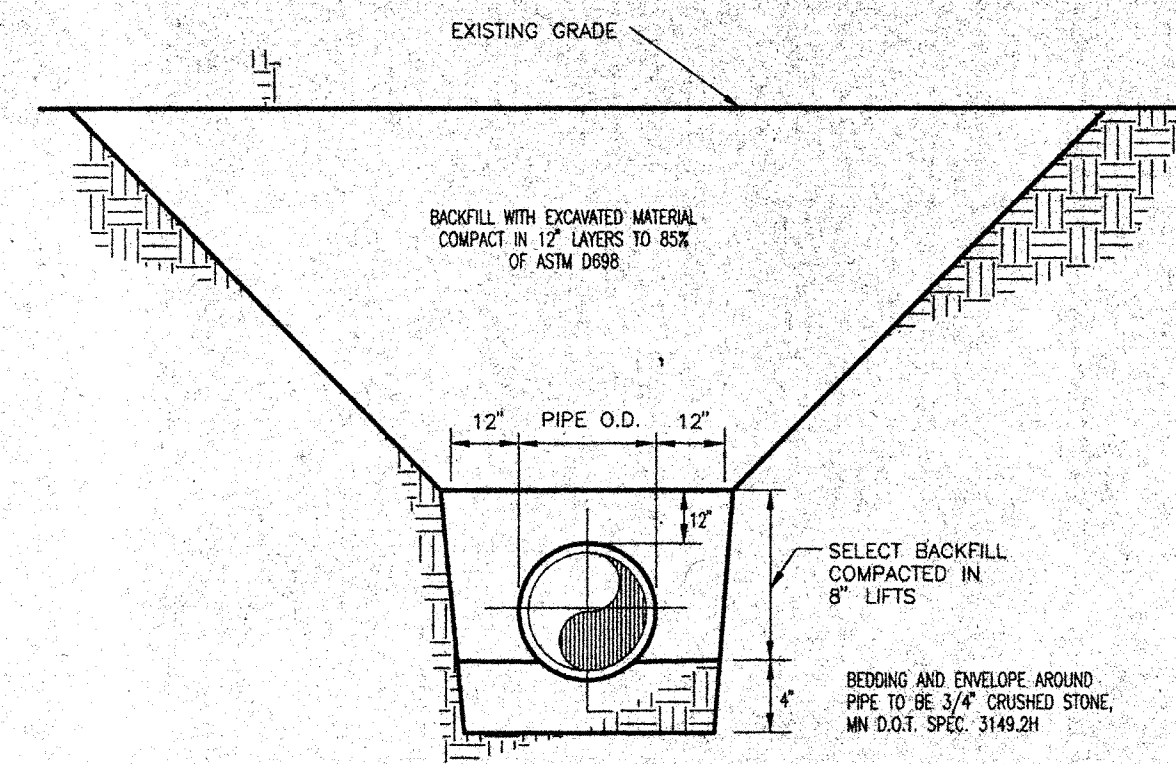
**BITUMINOUS SURFACE AND CURB & GUTTER REMOVAL AND REPLACEMENT LOCATIONS**



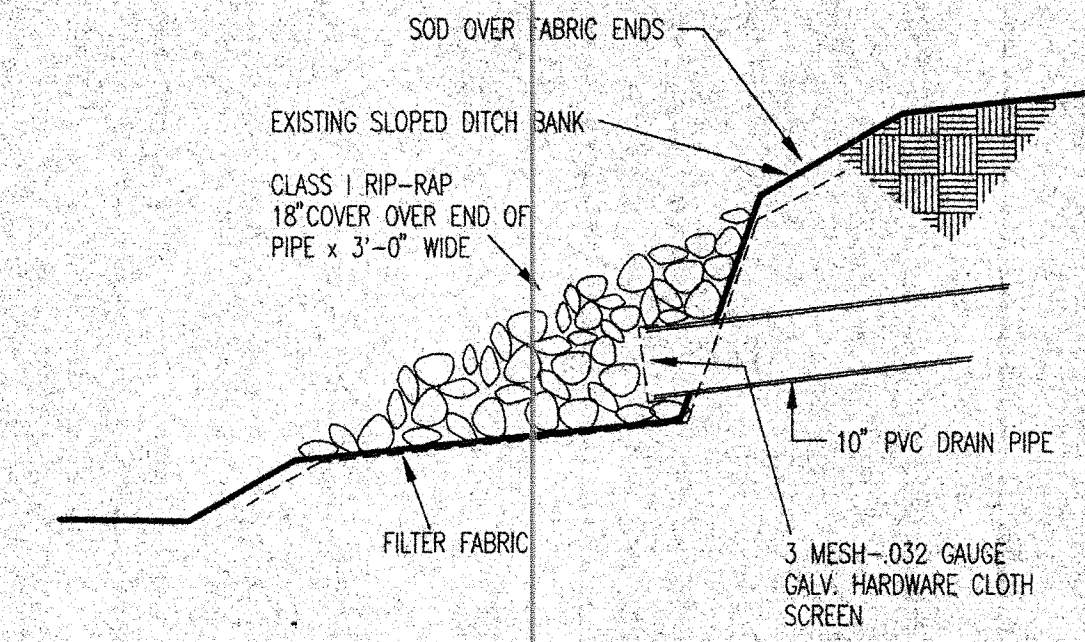
**TYPICAL SUB-SURFACE DRAINAGE DETAIL**



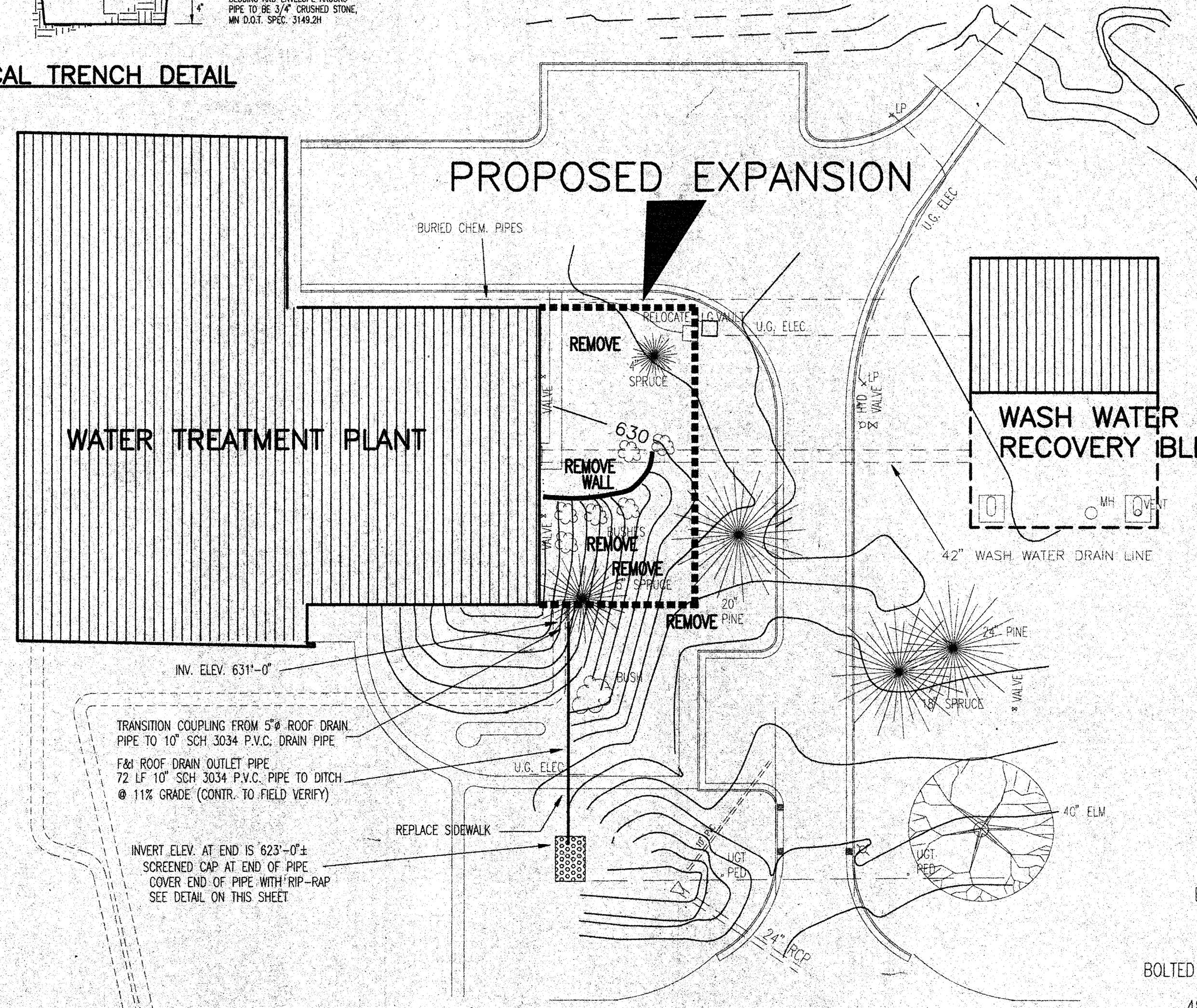
**TYPICAL SECTION FOR SURFACE REPLACEMENT**



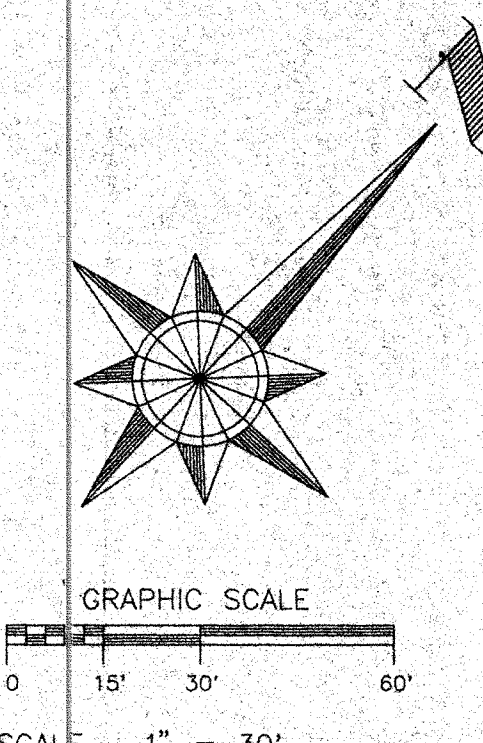
**TYPICAL TRENCH DETAIL**



**RIP-RAPPED ROOF DRAIN OUTLET**



**WARNING**  
 BEFORE DIGGING CALL  
 1-800-252-1166  
 REQUIRED BY LAW



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of Minnesota.  
 Date: \_\_\_\_\_  
 No. \_\_\_\_\_

DESIGNED BY	WJC
DRAWN BY	RJB
CHECKED BY	GLE
SURVEYED BY	RREM
SCALE:	1" = 30'

408 BOARD OF TRADE BUILDING  
 DULUTH, MINNESOTA 55802

**AREM, INC.**  
 CONSULTING ENGINEERS

NO.	DATE	DESCRIPTION
1	9/17/13	REVISED TO RECORD DRAWING

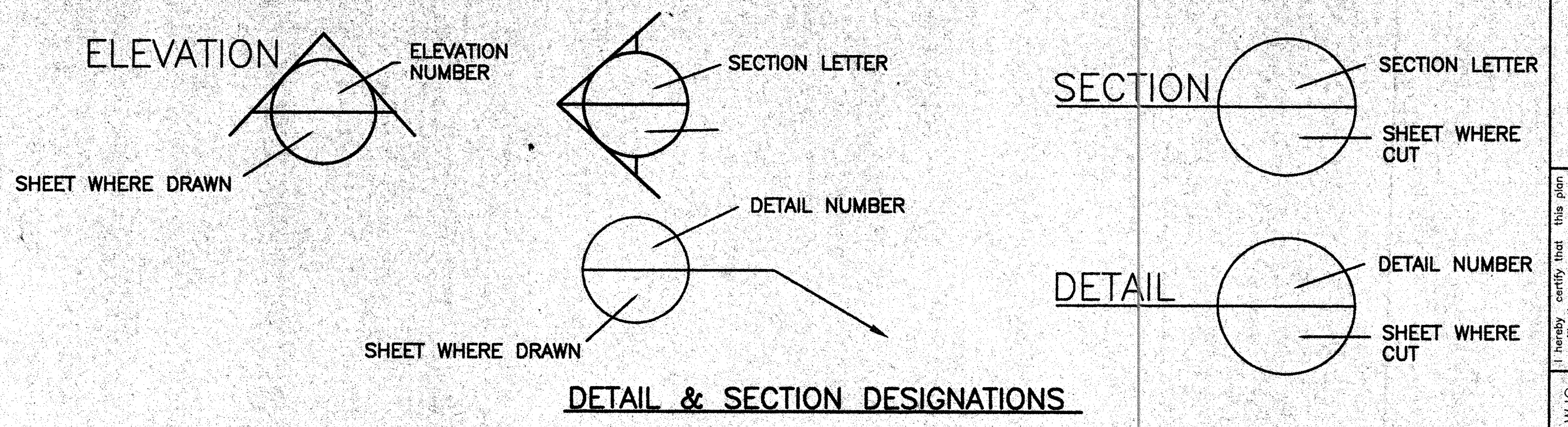
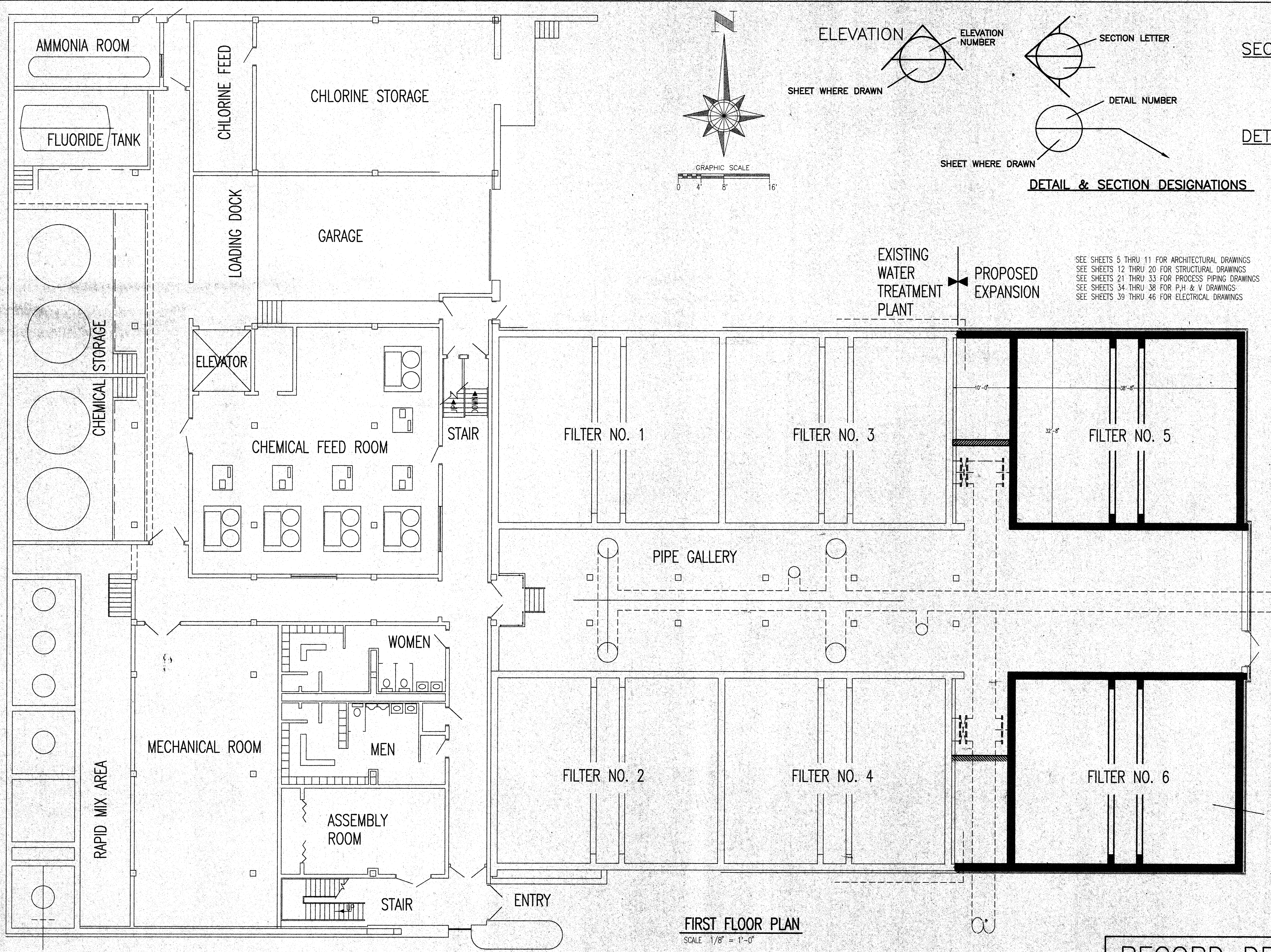
DULUTH WATER  
 TREATMENT PLANT EXPANSION  
 DULUTH, MINNESOTA  
 SITE PLAN

DATE	AUG. 91
W.C. No.	9126
SHEET NO.	2
OF	46

**BENCH MARK**  
 U.S.C.&G.S. BM -K-19-1933, EL. 625.95  
 BRASS TABLET ON FACE OF STAIRWAY RAIL,  
 N.W. ENTRY TO LAKEWOOD PUMP STATION

**RECORD DRAWING**

File name: 9126-2  
 Plot scale: 1" = 30'  
 xref



SEE SHEETS 5 THRU 11 FOR ARCHITECTURAL DRAWINGS  
 SEE SHEETS 12 THRU 20 FOR STRUCTURAL DRAWINGS  
 SEE SHEETS 21 THRU 33 FOR PROCESS PIPING DRAWINGS  
 SEE SHEETS 34 THRU 38 FOR P.H. & V DRAWINGS  
 SEE SHEETS 39 THRU 46 FOR ELECTRICAL DRAWINGS

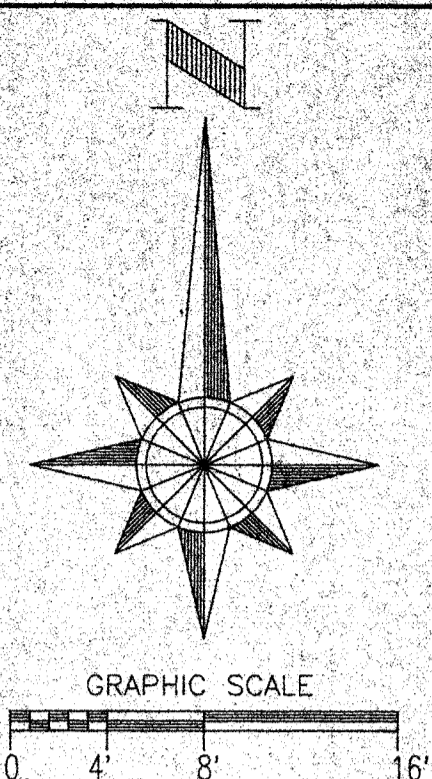
NOTE  
 ONLY THE CONC.  
 STRUCTURE &  
 SUPERSTRUCTURE  
 TO BE BUILT FOR  
 FILTER NO. 6,  
 MECH. & FILTER MEDIA  
 TO BE FUTURE

FIRST FLOOR PLAN  
 SCALE 1/8" = 1'-0"

RECORD DRAWING

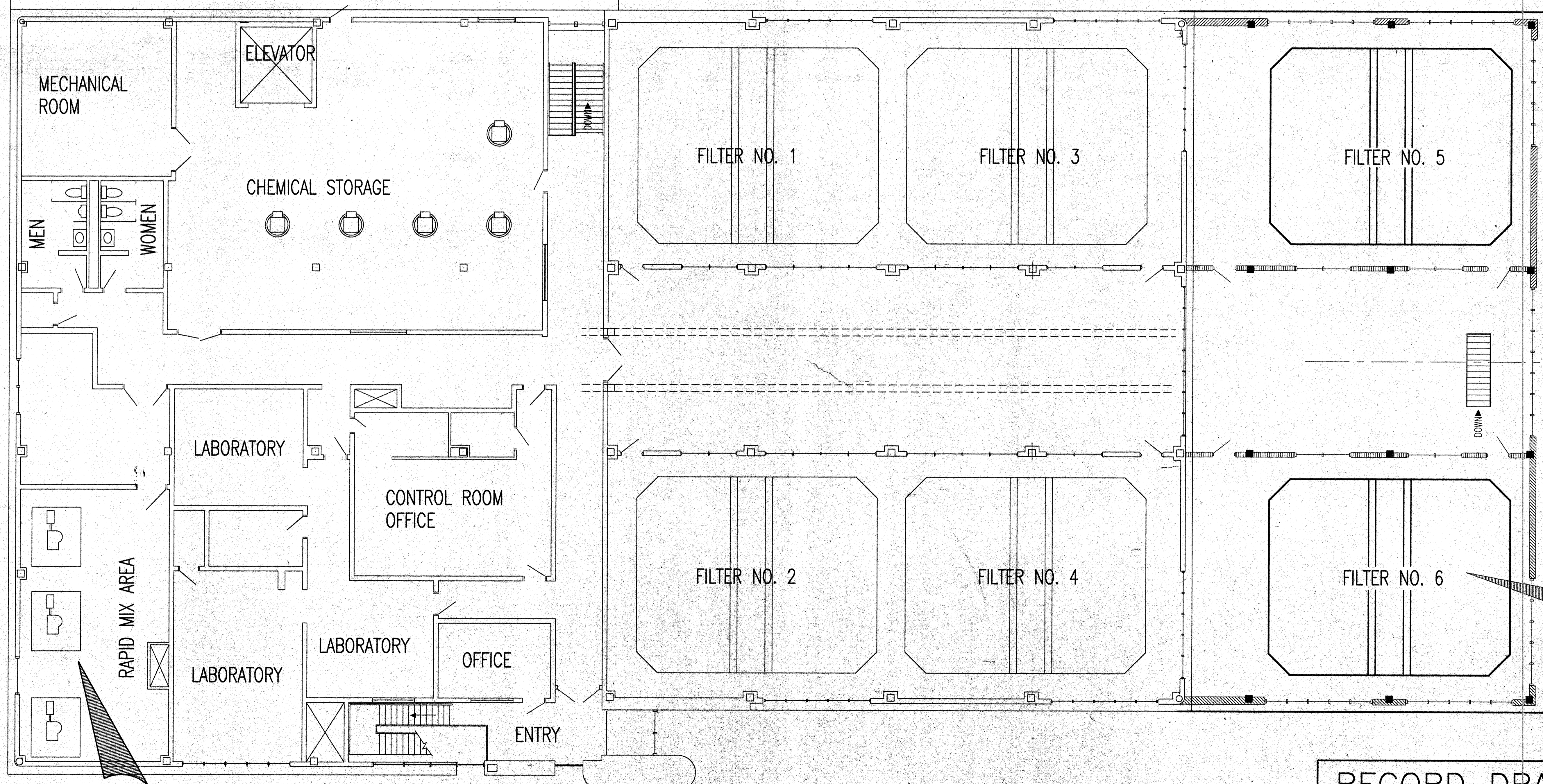
DATE: 9/25/91  
 PLOT DATE: 1/1/96  
 SCALE: 1/8" = 1'-0"

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of Minnesota.		DATE	REG. NO.
DESIGNED BY	WJG	DATE	
DRAWN BY	RJB	DATE	
CHECKED BY	GLE	DATE	
SURVEYED BY	RREM	DATE	
SCALE: 1/8" = 1'-0"			
408 BOARD OF TRADE BUILDING DULUTH, MINNESOTA 55802			
<b>AREM, INC.</b> CONSULTING ENGINEERS			
REVISIONS	NO.	DATE	
1	REVISED TO RECORD DRAWING	9-17-93	
DULUTH WATER TREATMENT PLANT EXPANSION DULUTH, MINNESOTA PROJECT LOCATION MAP			
DATE	AUG. 91		
W.O. No.	9126		
SHEET NO.	3	OF	46



SEE SHEETS 5 THRU 11 FOR ARCHITECTURAL DRAWINGS  
 SEE SHEETS 12 THRU 20 FOR STRUCTURAL DRAWINGS  
 SEE SHEETS 21 THRU 33 FOR PROCESS PIPING DRAWINGS  
 SEE SHEETS 34 THRU 38 FOR P,H & V DRAWINGS  
 SEE SHEETS 39 THRU 46 FOR ELECTRICAL DRAWINGS

EXISTING WATER TREATMENT PLANT  
 PROPOSED EXPANSION



MODIFICATIONS TO TOP OF RAPID MIX CHAMBERS  
 SEE SHEETS 11 & 28

OPERATING FLOOR PLAN  
 SCALE 1/8" = 1'-0"

RECORD DRAWING

I hereby certify that this plan specification or report was prepared by me, or under my supervision, and that I am a duly registered professional engineer under the laws of the state of Minnesota.

DESIGNED BY: WJG  
 DRAWN BY: RJB  
 CHECKED BY: GLE  
 SURVEYED BY: RREM  
 SCALE: 1/8" = 1'-0"

408 BOARD OF TRADE BUILDING  
 DULUTH, MINNESOTA 55802

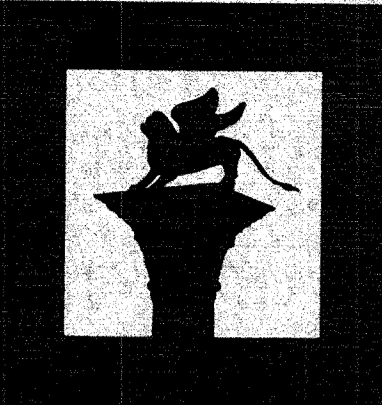
**RREM, INC.**  
 CONSULTING ENGINEERS

NO.	DESCRIPTION	DATE
1	REVISED TO RECORD DRAWING	8/7/93

DULUTH WATER TREATMENT PLANT EXPANSION  
 DULUTH, MINNESOTA  
 PROJECT LOCATION MAP

DATE: AUG-91  
 W.O. No. 9126  
 SHEET NO. 4 OF 46

file name: 9126-B1  
 plot view: 1  
 scale: 1/8" = 1'-0"  
 xref:



Melander  
Melander  
&  
Schilling  
ARCHITECTS  
M C M L X X I

202  
Board of Trade Building  
Duluth, MN 55802-1613  
218 727-5044

I hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly registered ARCHITECT under the laws of the State of MINNESOTA.  
Date 8-12-91 Reg. No. 16371

DULUTH WATER  
TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA

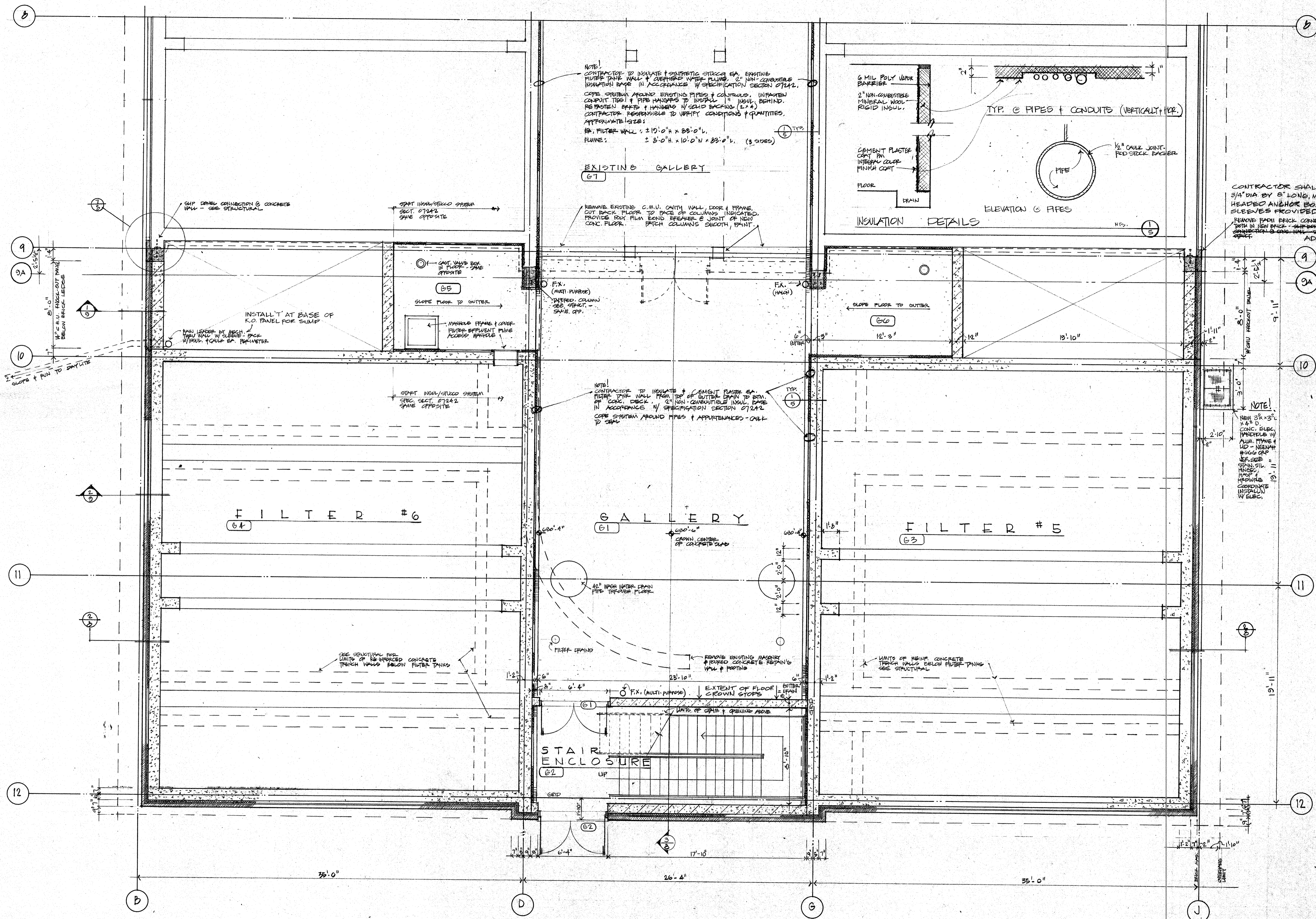
Sheet Title  
GALLERY FLOOR PLAN

Drawn By  
Checked By  
Job Number  
01623  
Date  
12 AUGUST 1991  
Revisions

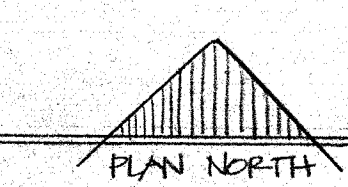
Sheet Number

5

Total Sheets

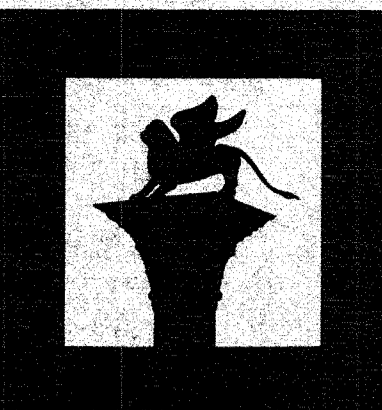


GALLERY FLOOR PLAN



1/4" = 12"

RECORD DRAWING



Melander  
Melander  
&  
Schilling

ARCHITECTS  
M C M L X X I

202

Board of Trade Building  
Duluth, MN 55802-1613  
218 727-5044

I hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly registered ARCHITECT under the laws of the State of MINNESOTA.  
Date 3-12-91 Reg. No. 16571

DULUTH WATER  
TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA

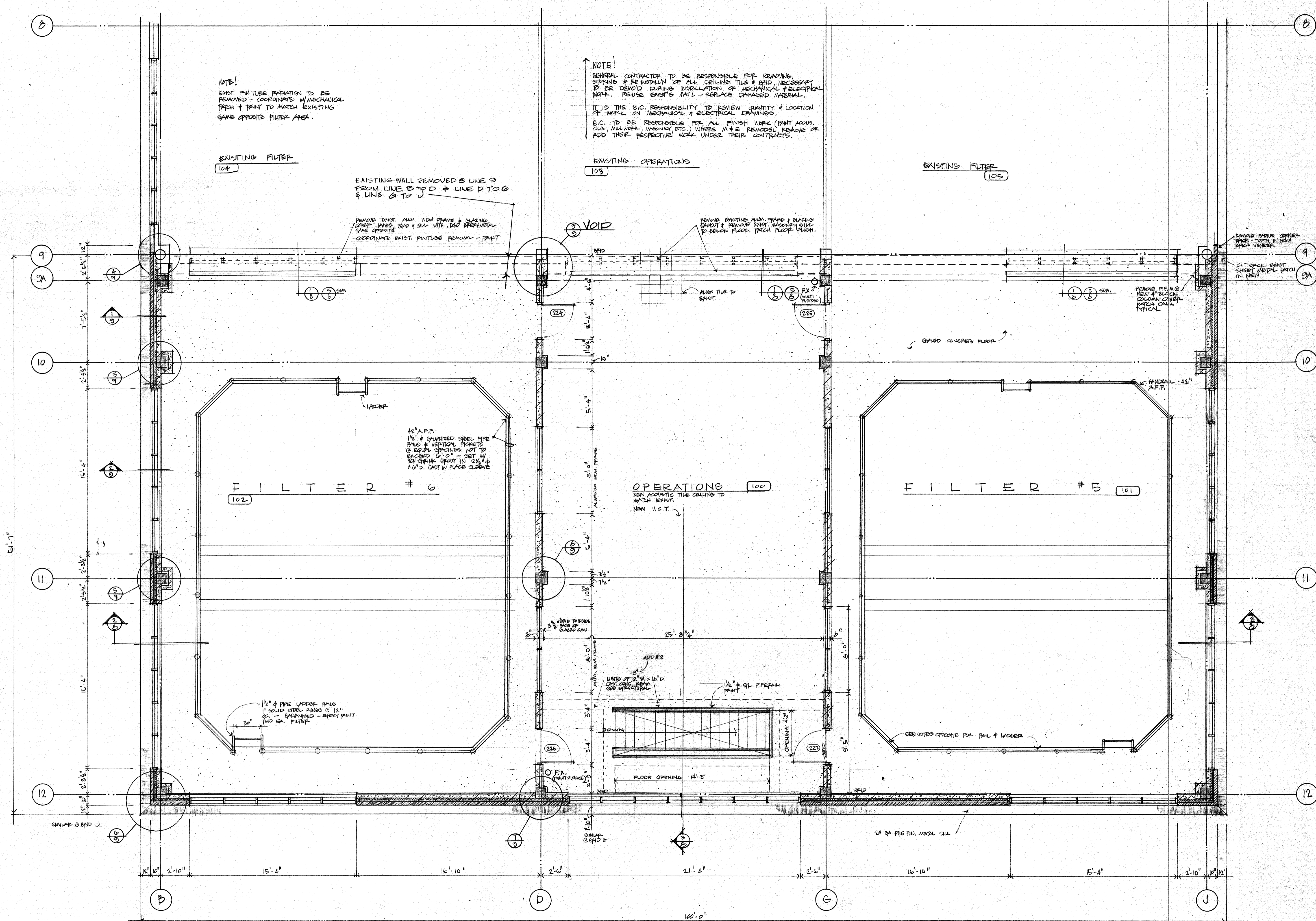
Sheet Title  
OPERATION FLOOR PLAN

Drawn By  
Checked By  
Job Number  
21629  
Date  
12 AUGUST 1991  
Revisions

Sheet Number

6

Total Sheets



NOTE!  
EXIST. FIN TUBE RADIATION TO BE REMOVED - COORDINATE W/MECHANICAL PATCH & PAINT TO MATCH EXISTING SAME OPPOSITE FILTER AREA.

NOTE!  
GENERAL CONTRACTOR TO BE RESPONSIBLE FOR REMOVING, SPRING & REINSTALLING ALL CEILING TILE & GRID, NECESSARY TO BE DEMO'D DURING INSTALLATION OF MECHANICAL & ELECTRICAL WORK. REUSE EXIST'G MAT'L - REPLACE DAMAGED MATERIAL.  
IT IS THE O.C. RESPONSIBILITY TO REVIEW QUANTITY & LOCATION OF WORK ON MECHANICAL & ELECTRICAL DRAWINGS.  
B.C. TO BE RESPONSIBLE FOR ALL FINISH WORK (PAINT, ACOUS, CUS, MILLWORK, MASONRY ETC.) WHERE M+E REMODEL REMOVE OR ADD THEIR RESPECTIVE WORK UNDER THEIR CONTRACTS.

EXISTING FILTER  
104

EXISTING OPERATIONS  
103

EXISTING FILTER  
105

EXISTING WALL REMOVED @ LINE 9 FROM LINE B TO D & LINE D TO G & LINE G TO J

REMOVE EXIST. ALUM. W/IN FRAME & GLAZING. COORDINATE BRIST. FIN TUBE REMOVAL - PAINT

VOID

REMOVE EXISTING ALUM. FRAME & GLAZING. REMOVE EXIST. MASONRY SILL TO BELOW FLOOR. PATCH FLOOR FINISH.

REMOVE RADIUS CORNER BRIST. TUBES IN NEW

REMOVE EXIST. ALUM. W/IN FRAME & GLAZING. COORDINATE BRIST. FIN TUBE REMOVAL - PAINT

FILTER # 6  
102

OPERATIONS  
NEW ACOUSTIC TILE CEILING TO MATCH EXIST.  
NEW V.C.T.

FILTER # 5  
101

1/2" PIPE LADDER RAILS  
1" SOLID STEEL RAILS @ 12" OS. - GALVANIZED - BRIST. PAINT  
TWO EA. FILTER

ADD #2  
LINES OF 10" W. 10" D. CAST CONC. BEAM SEE STRUCTURAL

SEE NOTES OPPOSITE FOR RAIL & LADDER

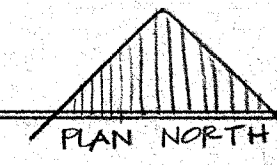
O P E R A T I O N

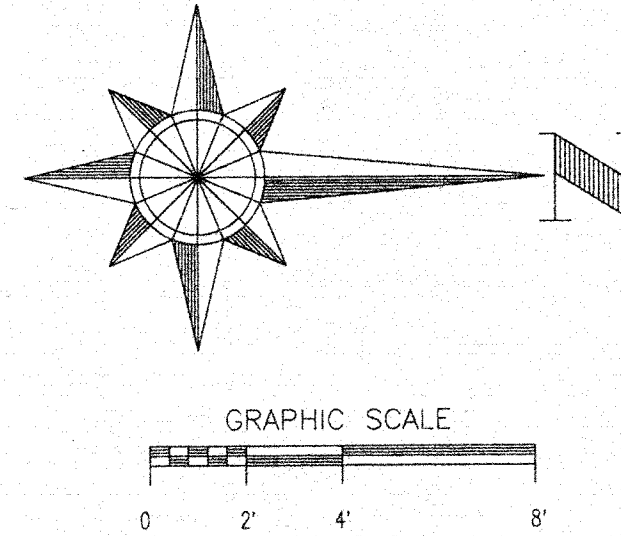
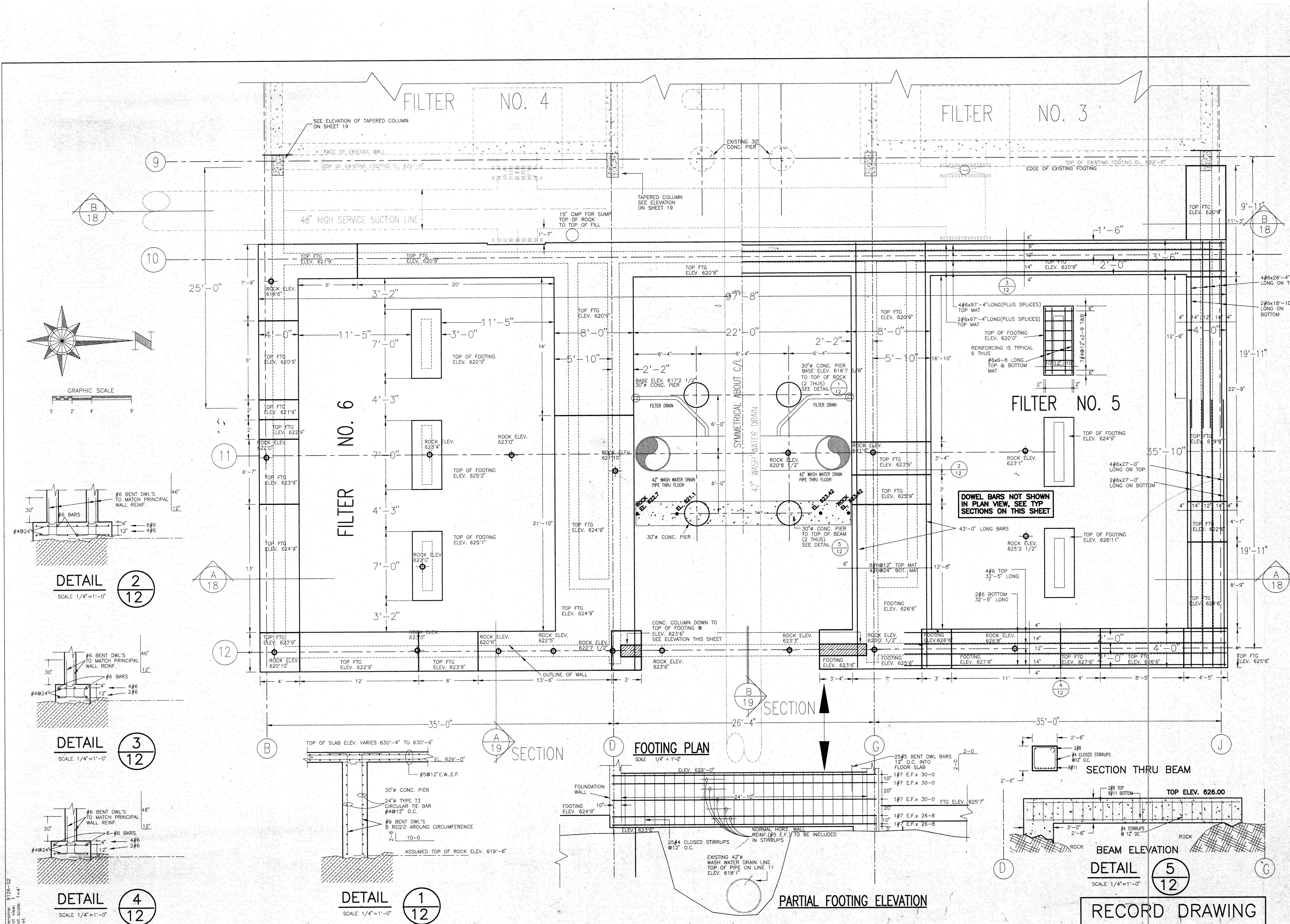
F L O O R

P L A N

RECORD DRAWING

1/4" = 12"





I hereby certify that the plan is a true and correct copy of the original as prepared by me or under my direct supervision, and that I am a duly registered professional engineer under the laws of the state of Minnesota.

DESIGNED BY: DCR  
 DRAWN BY: RJB  
 CHECKED BY: GLE  
 SURVEYED BY: RREM  
 SCALE: 1/4" = 1'-0"  
 DATE: \_\_\_\_\_

408 BOARD OF TRADE BUILDING  
 DULUTH, MINNESOTA 55802

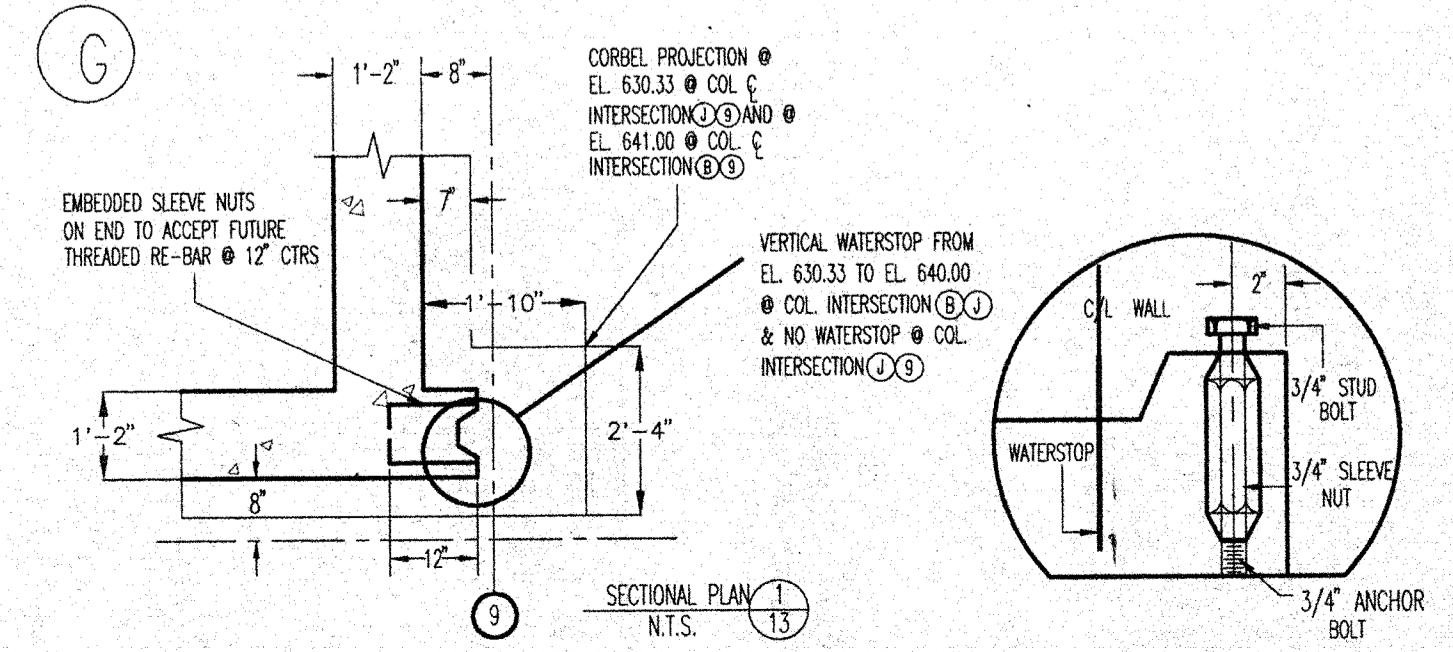
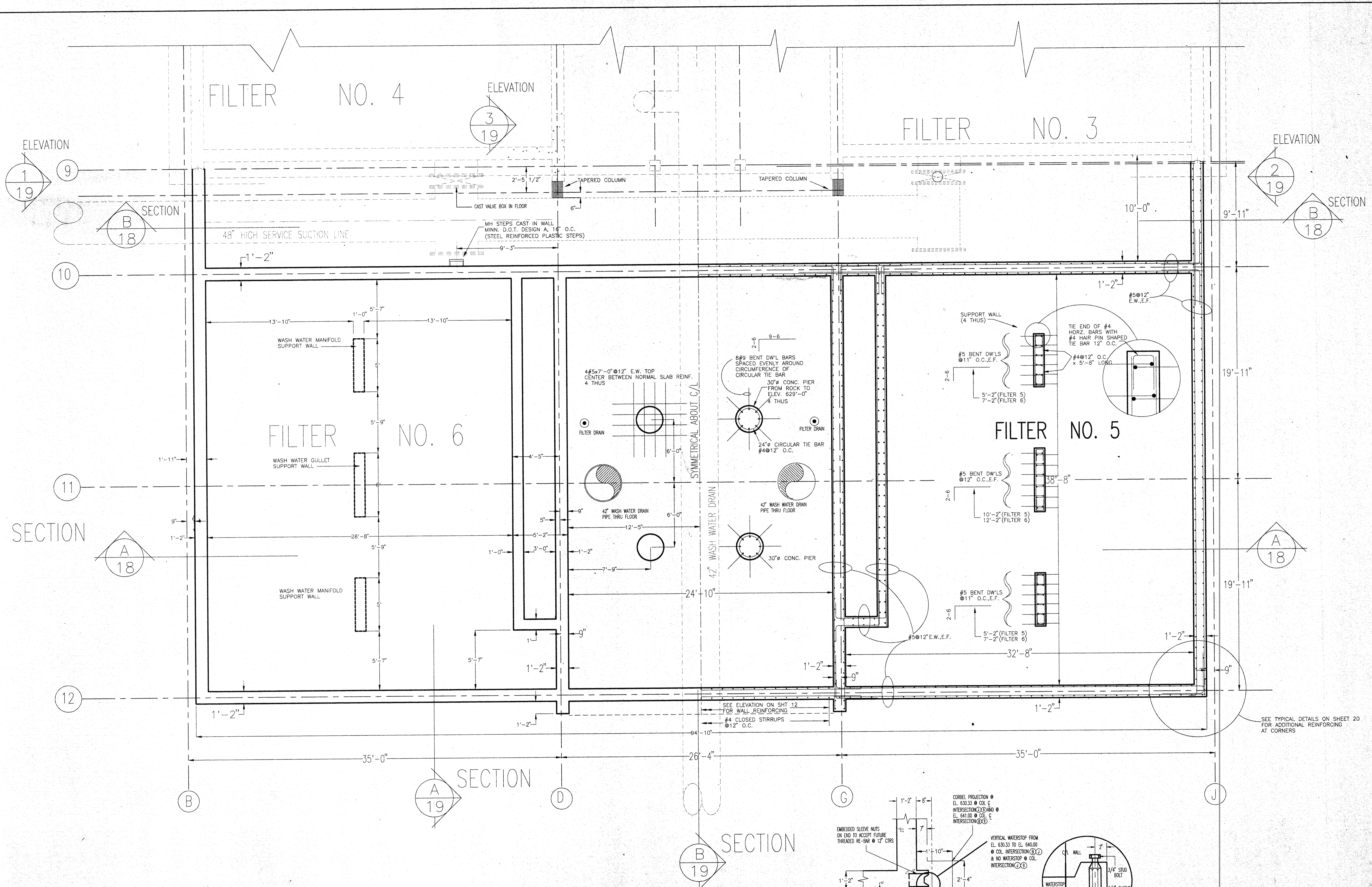
**PREM, INC.**  
 CONSULTING ENGINEERS

NO.	REVISION PER ADDENDUM	DESCRIPTION	DATE
1			9/4/93

DULUTH WATER  
 TREATMENT PLANT EXPANSION  
 DULUTH, MINNESOTA  
 STRUCTURAL FOOTING PLAN

DATE: AUG. 91  
 W.O. No. 9126  
 SHEET NO. 12 OF 46

11/20/91 9:12/53  
 plot view: 1/4"  
 plot scale: 1/4" = 1'-0"  
 11/20/91



**RECORD DRAWING**

DATE: AUG. 91		W.O. No. 9126		SHEET NO. 13		OF 46	
DULUTH WATER TREATMENT PLANT EXPANSION DULUTH, MINNESOTA STRUCT. - BELOW 629'-0"							
DESIGNED BY: DCR		DRAWN BY: RIB		CHECKED BY: WJC		SURVEYED BY: RREM	
408 BOARD OF TRADE BUILDING DULUTH, MINNESOTA 55802				CONSULTING ENGINEERS		SCALE: 1/4" = 1'-0" 1/4" = 1'-0"	
I hereby certify that this plan specification, or report was prepared by me, or under my supervision, and that I am a duly registered professional engineer under the laws of the state of Minnesota.		REG. NO.		DATE		REVISIONS	

FILTER NO. 4

FILTER NO. 3

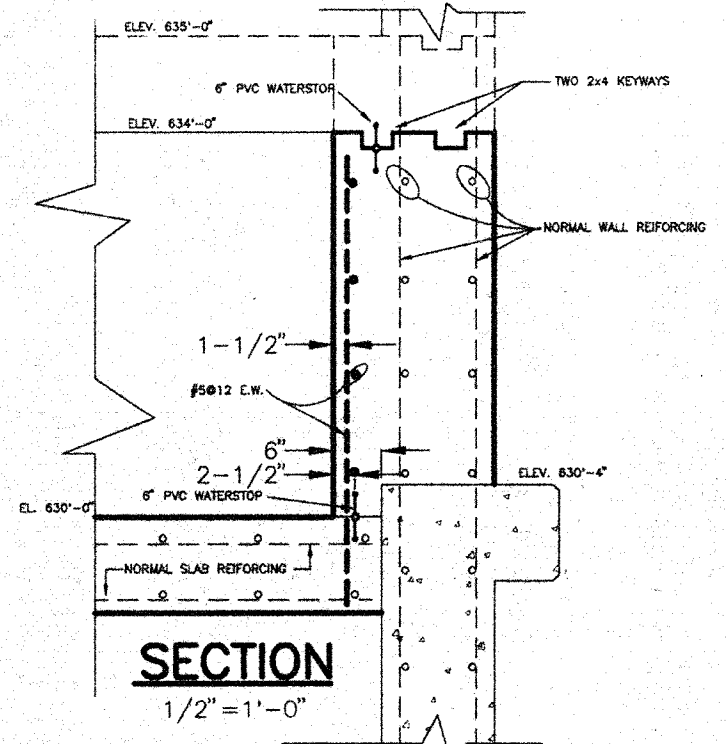
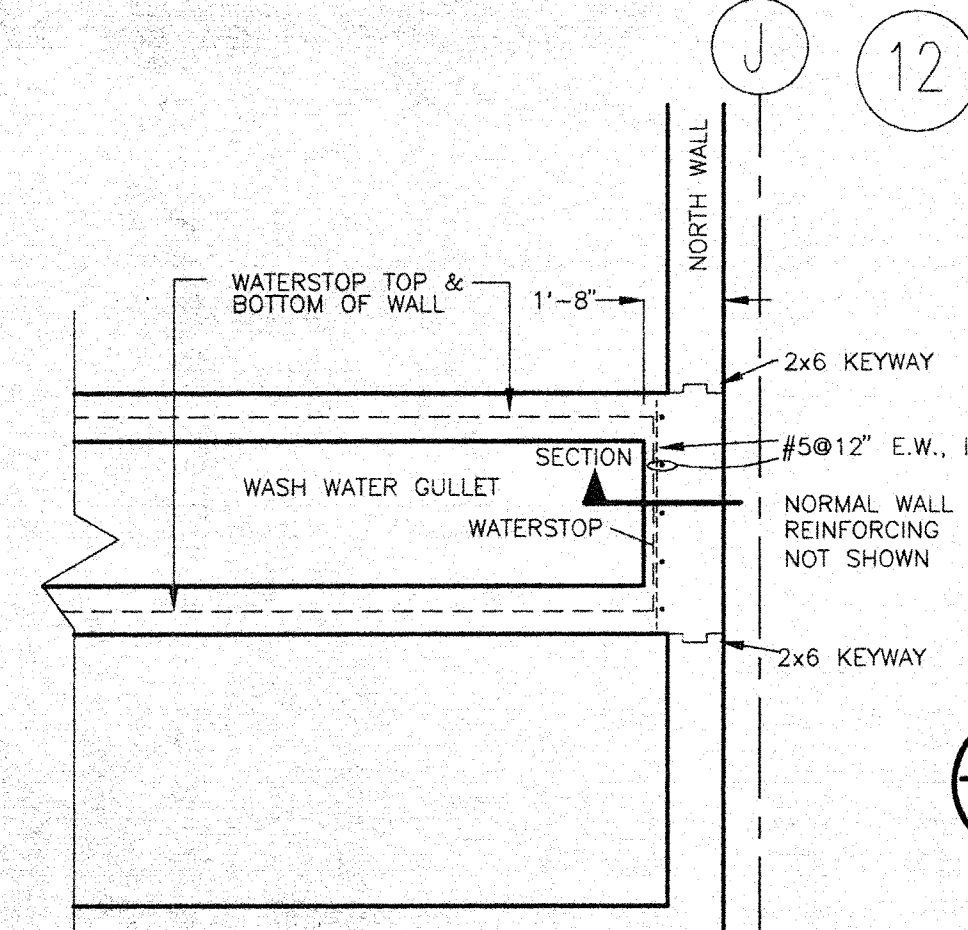
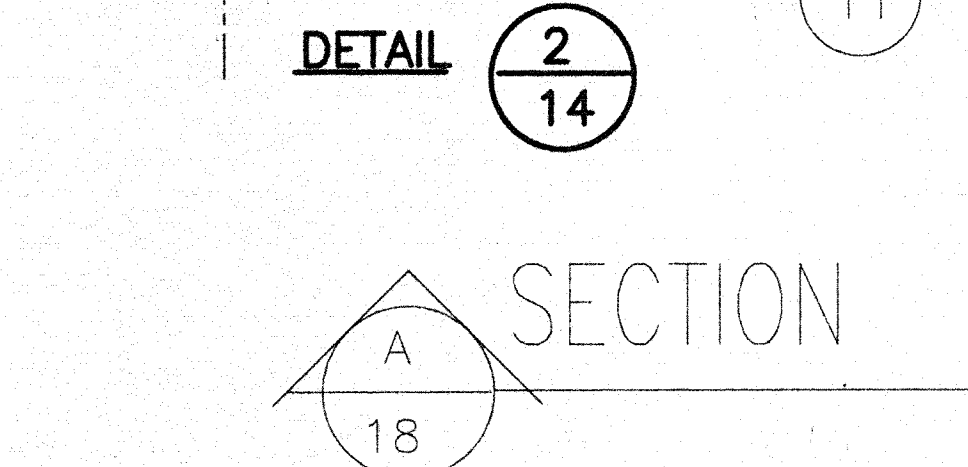
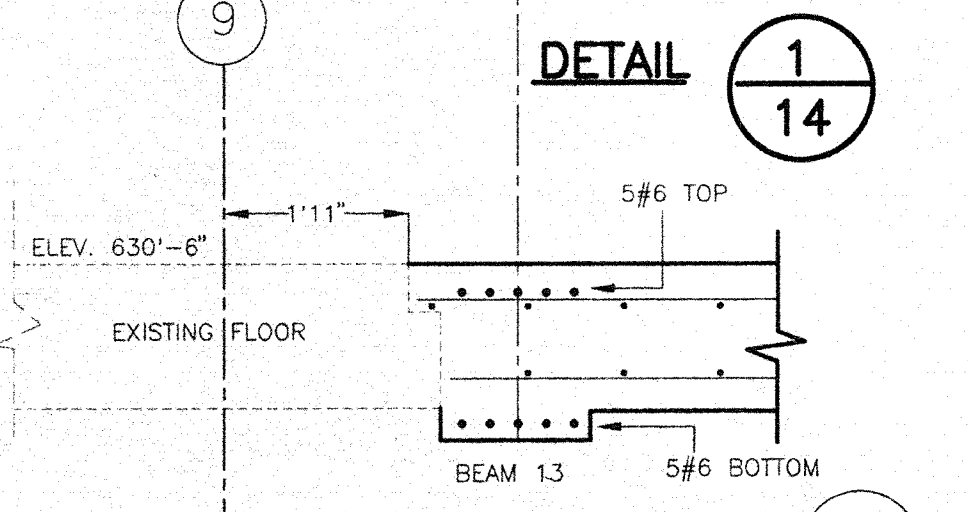
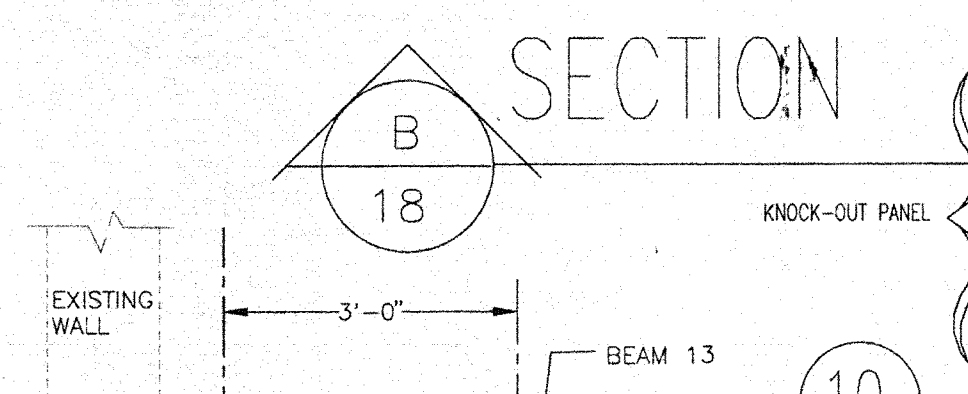
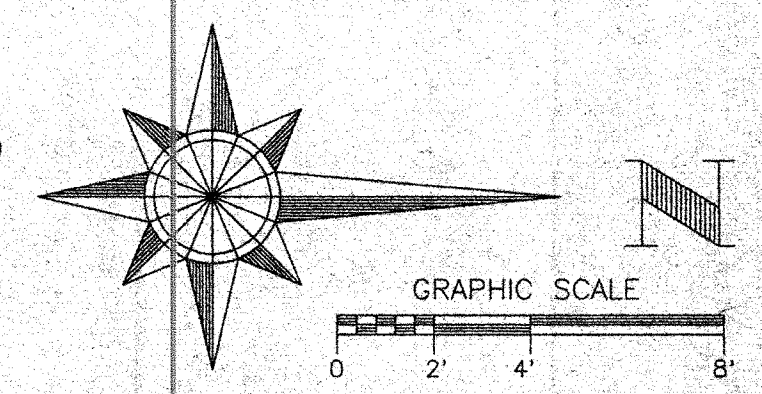
FILTER NO. 6

FILTER NO. 5

PLAN-FLOOR 630'-6"

SCALE 1/4"=1'-0"

NOTE: WALL INTERSECTIONS SHALL BE REINFORCED WITH CORNER BARS AS SHOWN ON THE "TYPICAL DETAILS OF WALL REINFORCEMENT"-SHEET 20 ADDENDUM #2, P4-#9&#11



I hereby certify that this plan specification or proposal was prepared by me or under my direct supervision and that I am a duly registered engineer under the laws of the state of Minnesota.

DESIGNED BY: DCR  
DRAWN BY: RJB  
CHECKED BY: WJG  
SURVEYED BY: RREM  
SCALE: 1/4"=1'-0"

408 BOARD OF TRADE BUILDING  
DULUTH, MINNESOTA 55802

PREM, INC.  
CONSULTING ENGINEERS

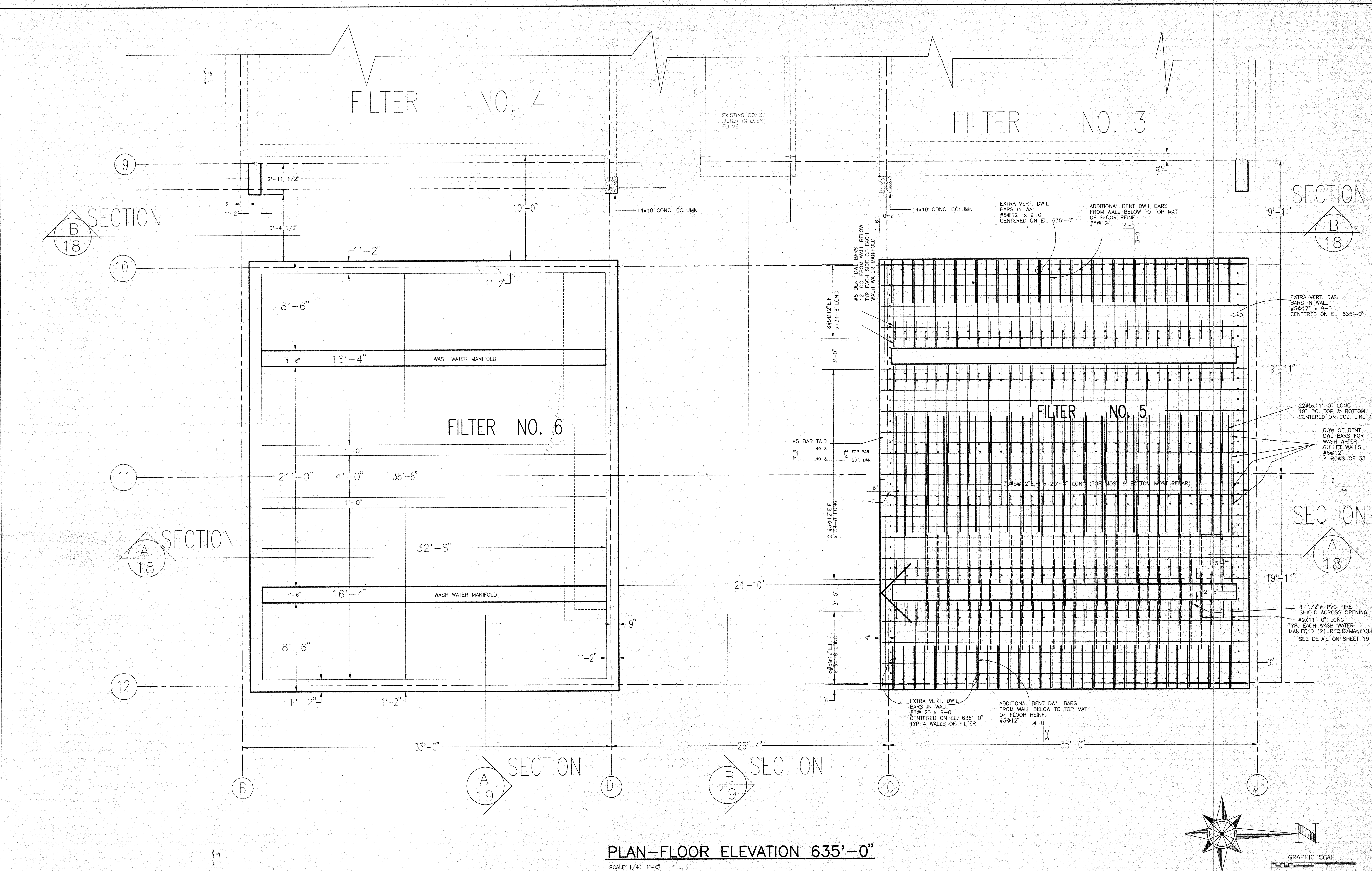
NO.	REVISIONS	DESCRIPTION	DATE
1	REVISED PER ADDENDUMS		9/2/91

DULUTH WATER TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA  
STRUCTURAL-FLOOR 630'-0"

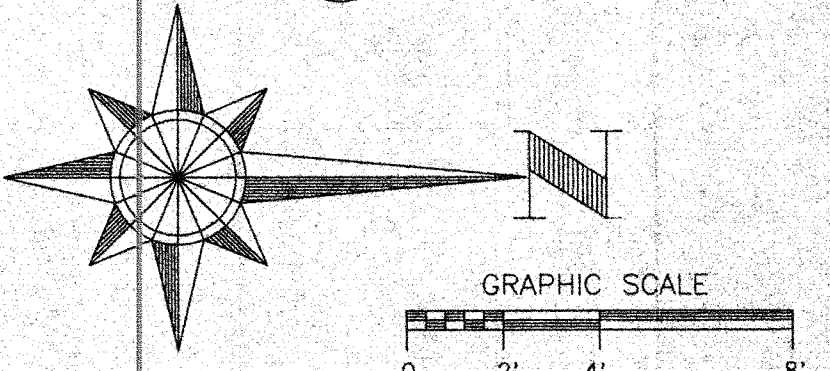
DATE: AUG. 91  
W.O. No. 9126  
SHEET NO. 14 OF 46

RECORD DRAWING

Filename: 9126-53A  
Plot view: 1  
Plot scale: 1/4"



**PLAN-FLOOR ELEVATION 635'-0"**  
SCALE 1/4"=1'-0"



hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly registered professional engineer under the laws of the state of Minnesota.

DATE: AUG 91  
W.O. No. 9126  
SHEET NO. 15 OF 46

DESIGNED BY: DCR  
DRAWN BY: RJB  
CHECKED BY: WJG  
SURVEYED BY: RREM  
SCALE: 1/4"=1'-0"

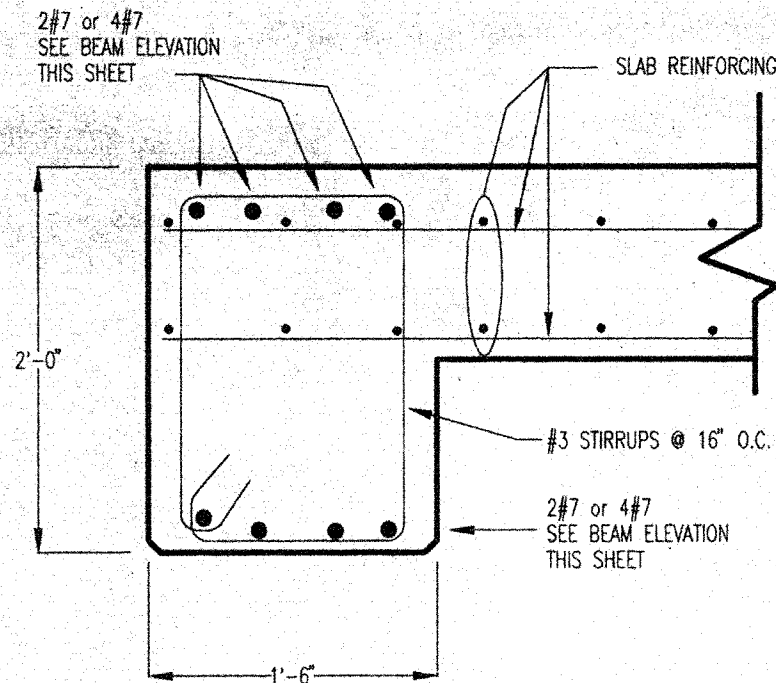
408 BOARD OF TRADE BUILDING  
DULUTH, MINNESOTA 55802

**AREM, INC.**  
CONSULTING ENGINEERS

NO.	REVISION PER ADDENDUM	DESCRIPTION	DATE
1			9/9/91

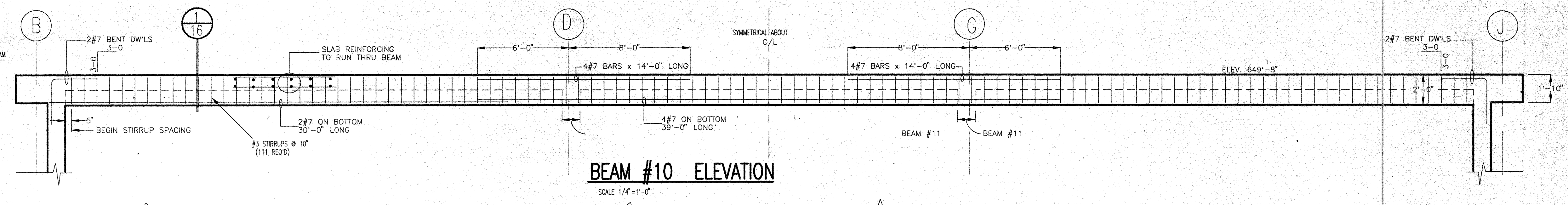
DULUTH WATER TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA  
STRUCTURAL - FLOOR 635'-0"

**RECORD DRAWING**

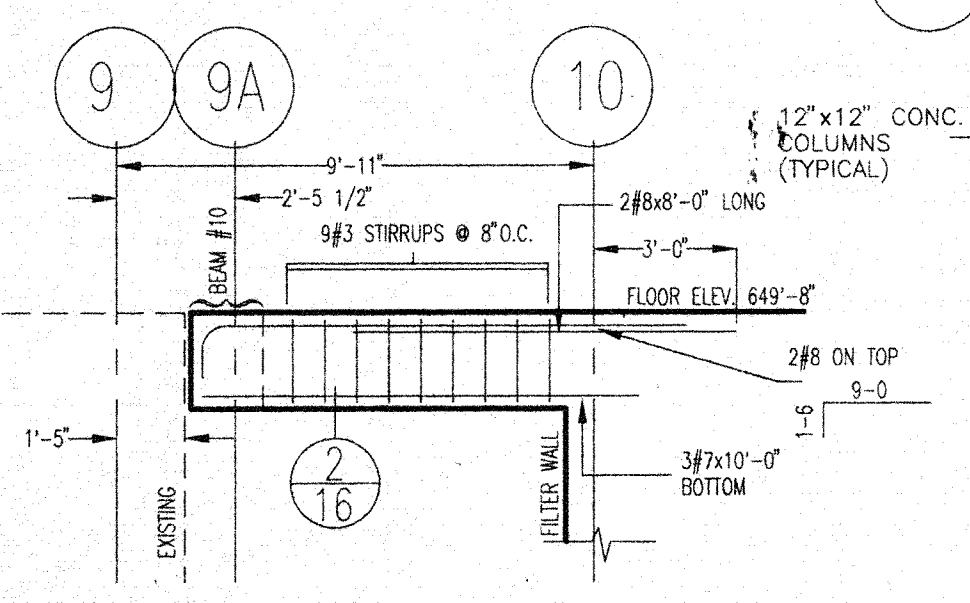


**BEAM 10 DETAIL**  
SCALE 1"=1'-0"

1  
16,19

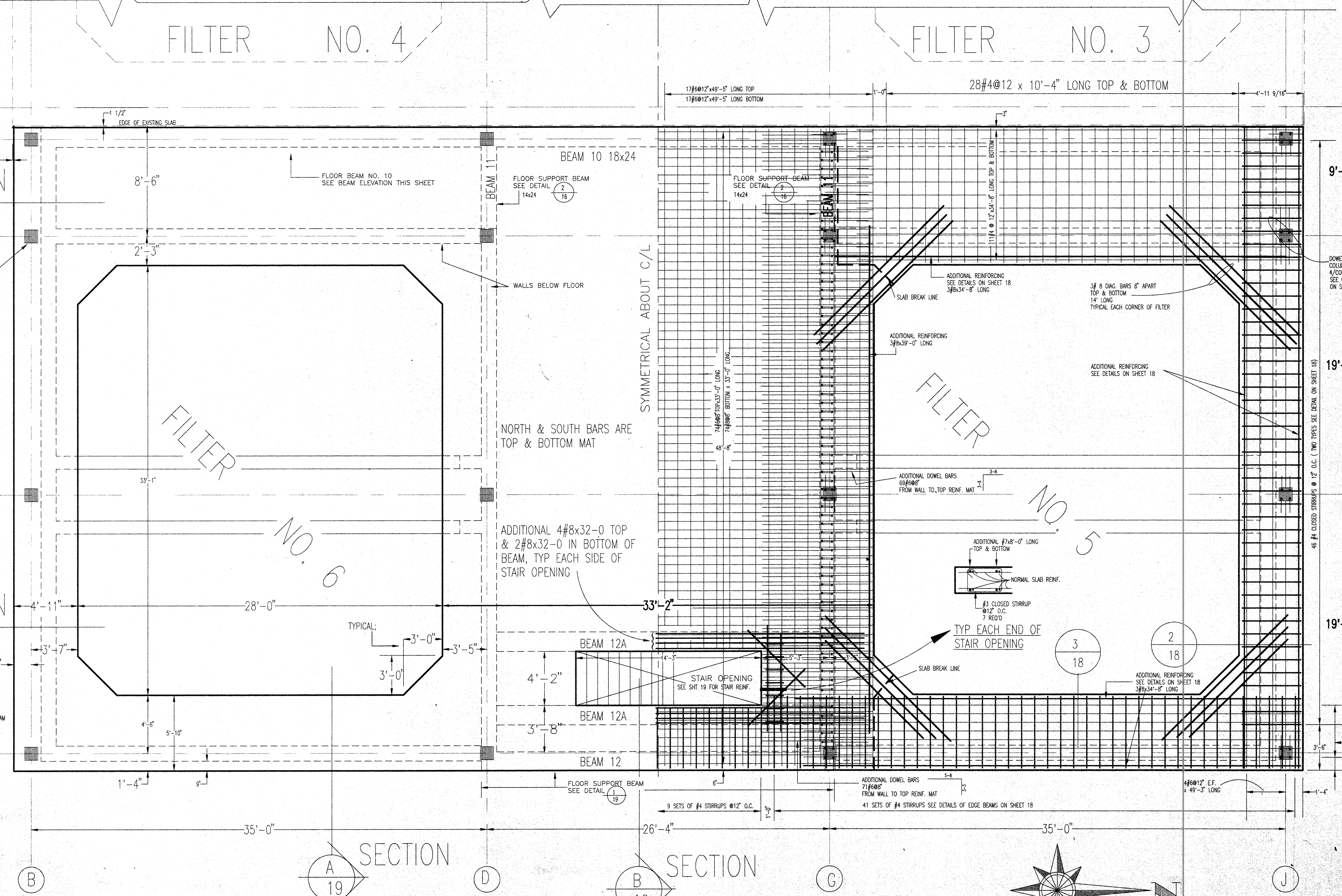


**BEAM #10 ELEVATION**  
SCALE 1/4"=1'-0"

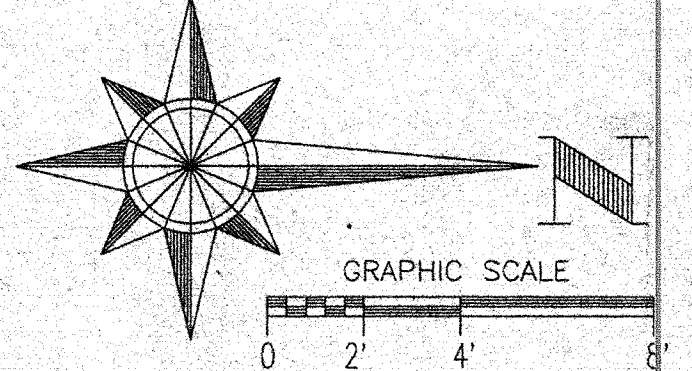


**ELEVATION BEAM #11**  
SCALE 1/4"=1'-0"

2  
16



**PLAN - ELEV. 649'-8"**  
SCALE 1/4"=1'-0"



**RECORD DRAWING**

Reference: 9126-S4  
plot scale: 1"=4'  
xref:

I hereby certify that this plan, specification, or report was prepared by me or under my supervision and that I am a duly registered professional engineer under the laws of the state of Minnesota.  
Date: \_\_\_\_\_  
Scale: 1/4"=1'-0"

DESIGNED BY	DCR
DRAWN BY	RUB
CHECKED BY	GLE
SURVEYED BY	RREM

408 BOARD OF TRADE BUILDING  
DULUTH, MINNESOTA 55802

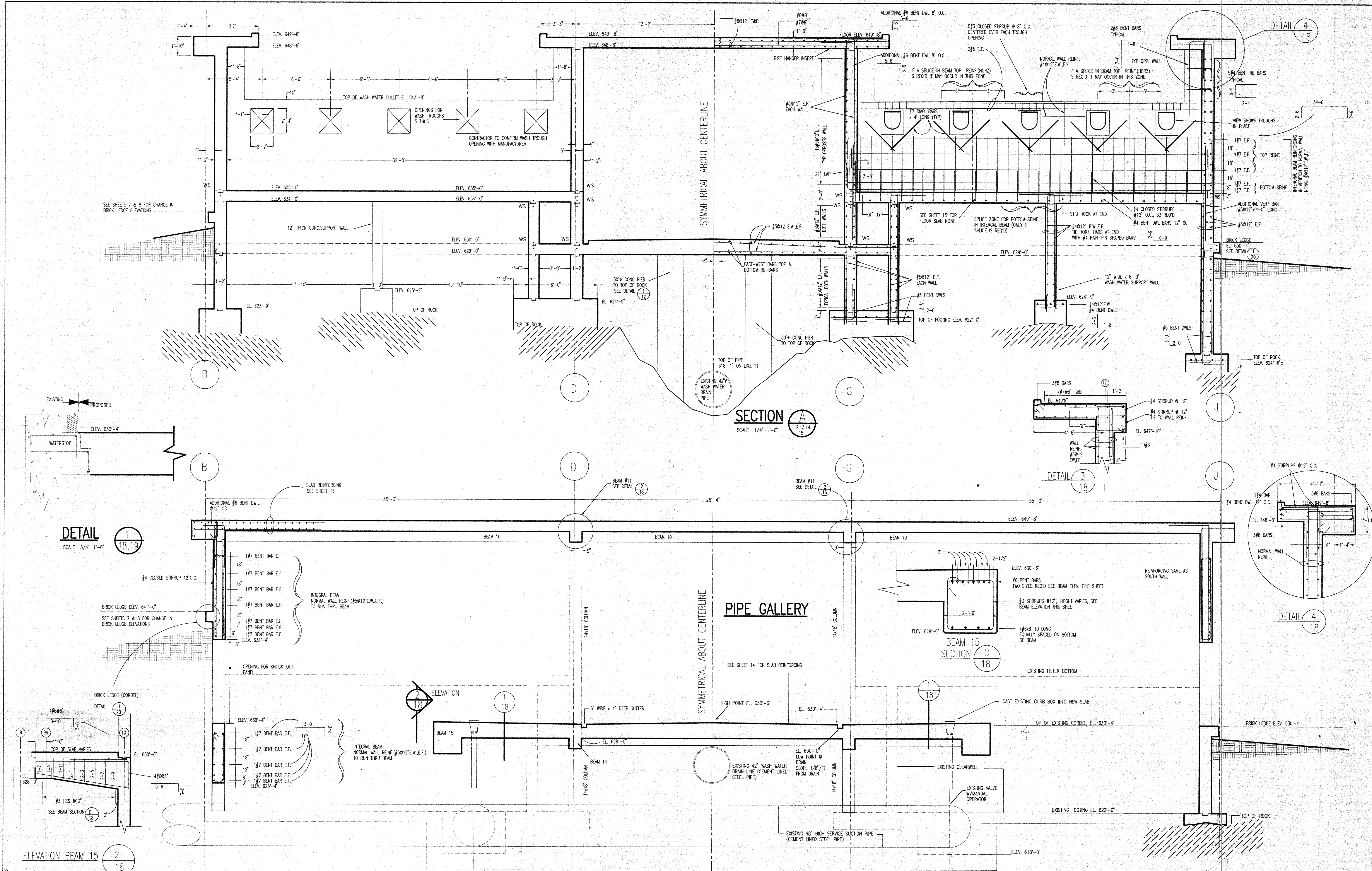
**PREM, INC.**  
CONSULTING ENGINEERS

NO.	DATE	DESCRIPTION	REVISIONS
1	9/9/91		

DULUTH WATER  
TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA  
STRUCTURAL FLOOR 649'-8"

DATE	AUG.91
W.D. No.	9126
SHEET NO.	16
OF	46

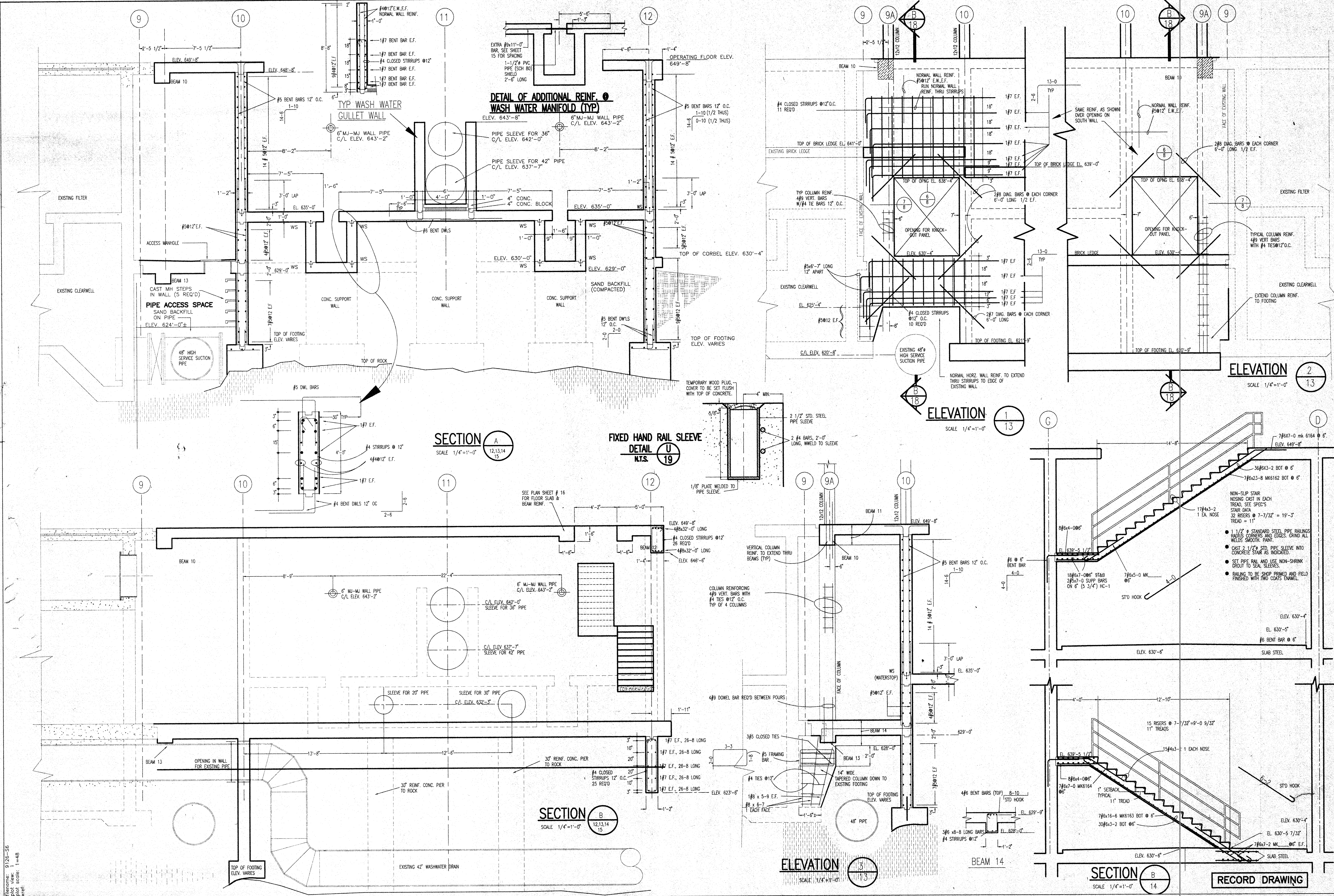
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 Plot View:  
 xref: 1=48



**SECTION B**  
 SCALE: 1/4"=1'-0"

**RECORD DRAWING**

DESIGNED BY		DCR
DRAWN BY		RJB
CHECKED BY		GLE
SURVEYED BY		RREM
SCALE:		1/4"=1'-0"
DULUTH WATER TREATMENT PLANT EXPANSION DULUTH, MINNESOTA		
408 BOARD OF TRADE BUILDING DULUTH, MINNESOTA 55802		
<b>AREM, INC.</b> CONSULTING ENGINEERS		
NO.	DESCRIPTION	DATE
1	ISSUED PER APPROVAL	8/1/01
DATE: AUG. 91 W.O. NO. 9126 SHEET NO. 18 OF 46		



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of Minnesota.

DESIGNED BY: DCR  
 DRAWN BY: RJB  
 CHECKED BY: GLE  
 SURVEYED BY: RRCM  
 SCALE: 1/4" = 1'-0"  
 408 BOARD OF TRADE BUILDING  
 DULUTH, MINNESOTA 55802

**PREM, INC.**  
 CONSULTING ENGINEERS

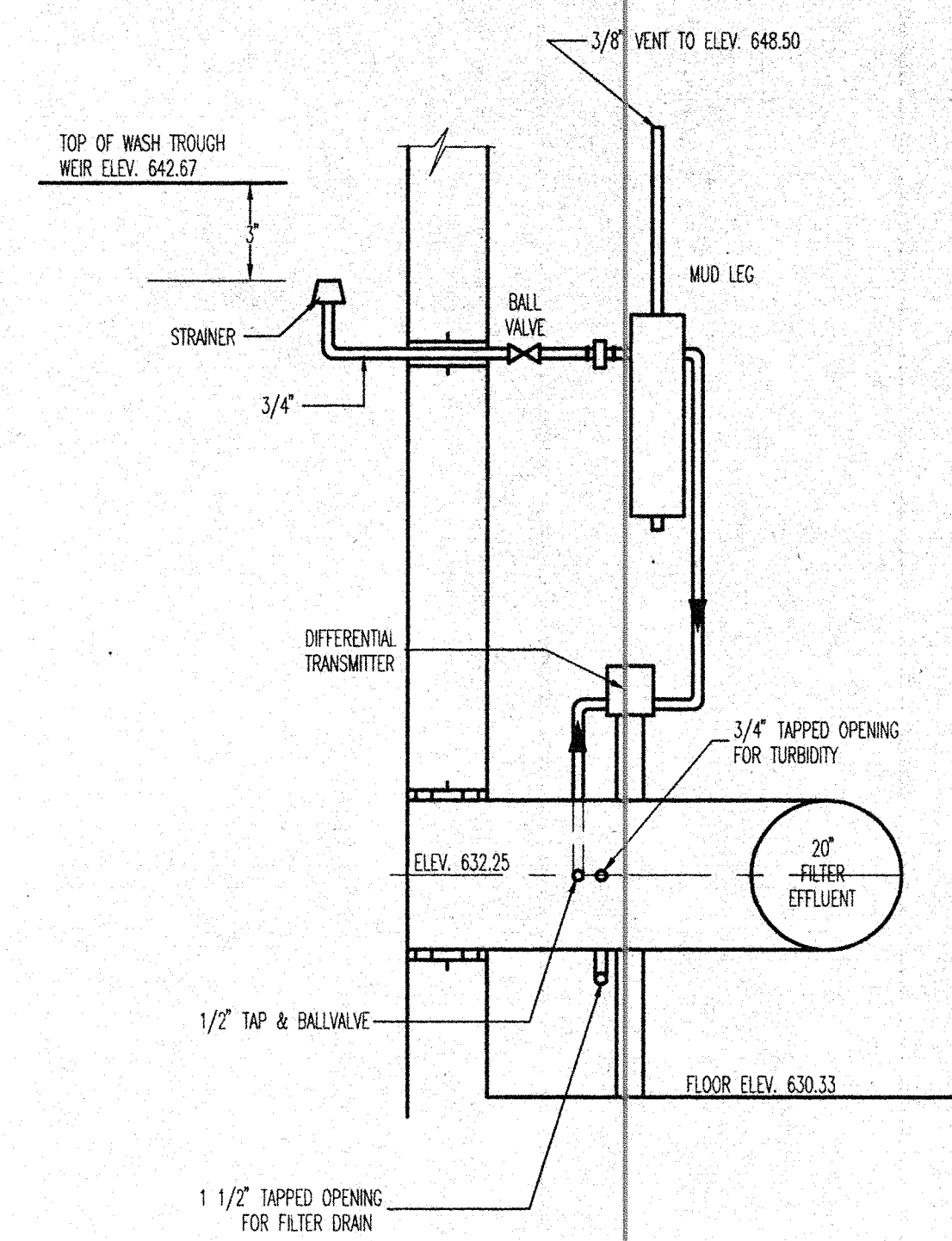
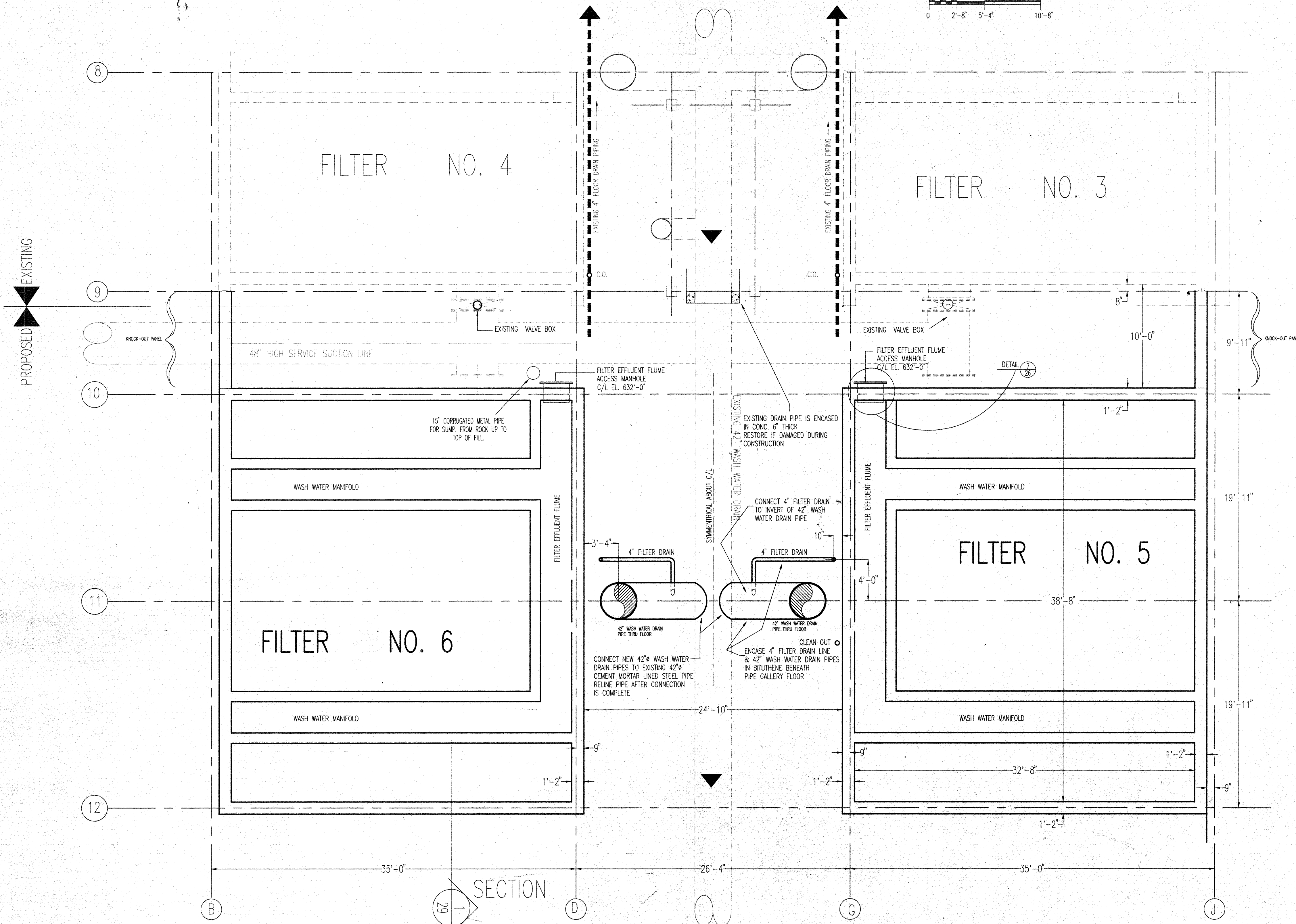
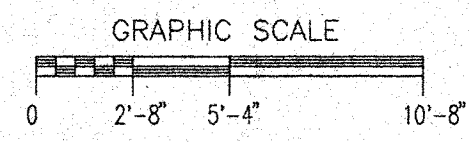
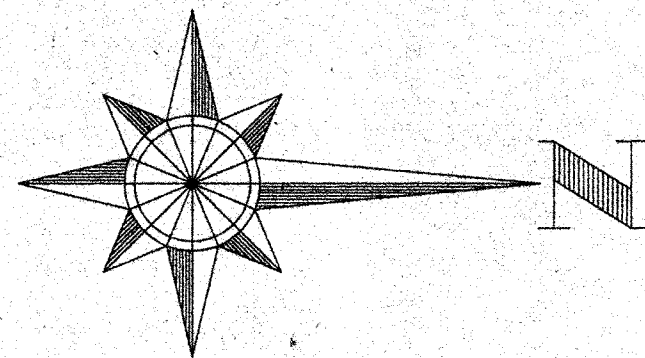
NO.	DESCRIPTION	DATE	REVISIONS
1	REVISION PER ADDENDUM	9/16/11	

DULUTH WATER TREATMENT PLANT EXPANSION  
 DULUTH, MINNESOTA  
 STRUCTURAL SECTIONS

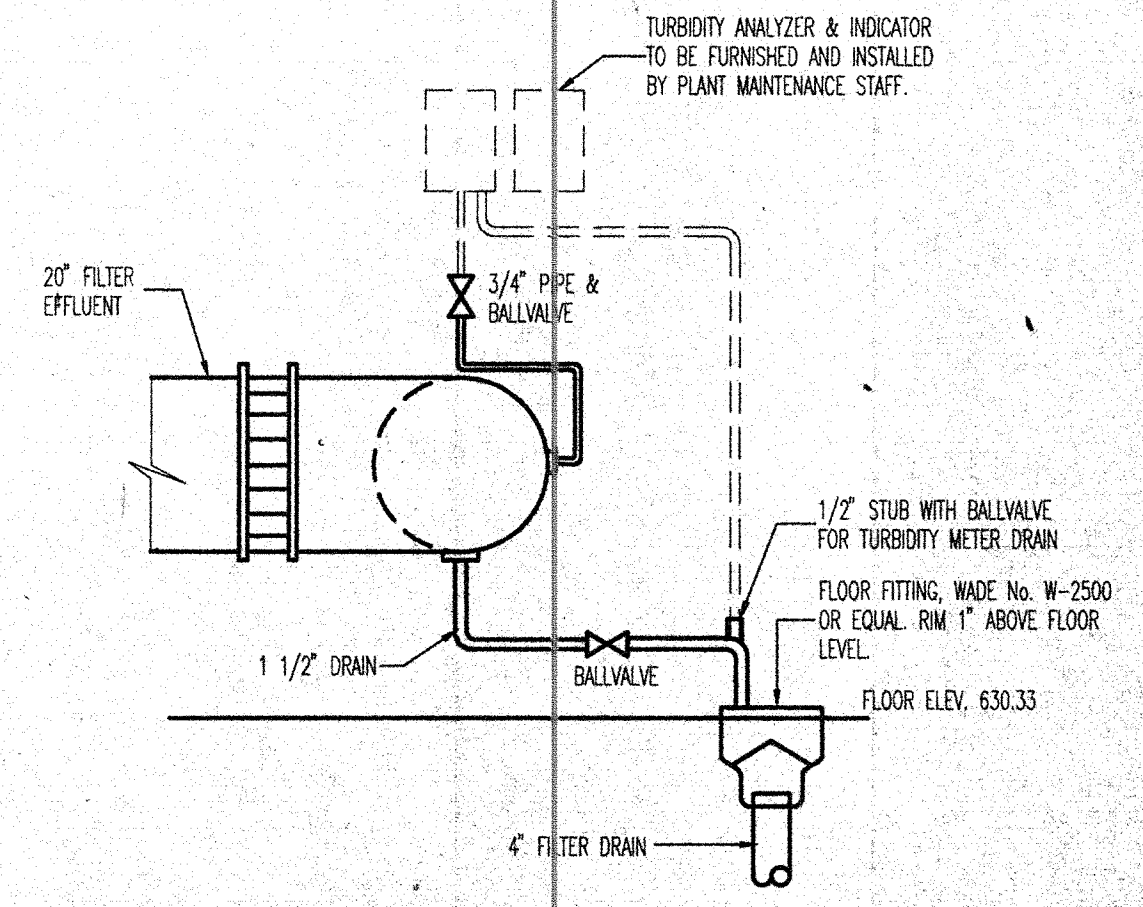
DATE: AUG. 91  
 W.O. No. 9126  
 SHEET NO. 19  
 OF 46

Filename: 9126-56  
 Plot View: 1  
 Scale: 1/4" = 1'-0"  
 Date: 9/16/11

**RECORD DRAWING**



**LOSS OF HEAD CONNECTIONS**  
N.T.S. 1/23



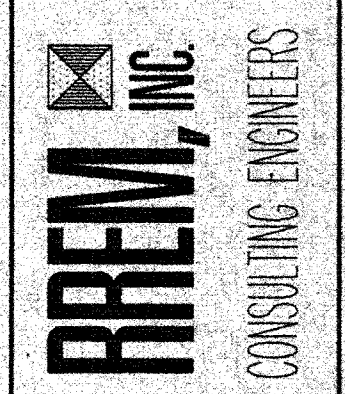
**FILTER EFFLUENT DRAIN AND TURBIDITY METER CONNECTIONS**  
N.T.S. 2/23

**PIPING BELOW ELEV. 630'-0"**  
SCALE 3/16"=1'-0"

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of Minnesota.  
date \_\_\_\_\_ reg. no. \_\_\_\_\_

DESIGNED BY	WUG
DRAWN BY	RUB
CHECKED BY	GLE
SURVEYED BY	RREM
SCALE:	3/16"=1'-0"

408 BOARD OF TRADE BUILDING  
DULUTH, MINNESOTA 55802



NO.	DESCRIPTION	DATE
1	REVISED TO RECORD DRAWING	4/29/91

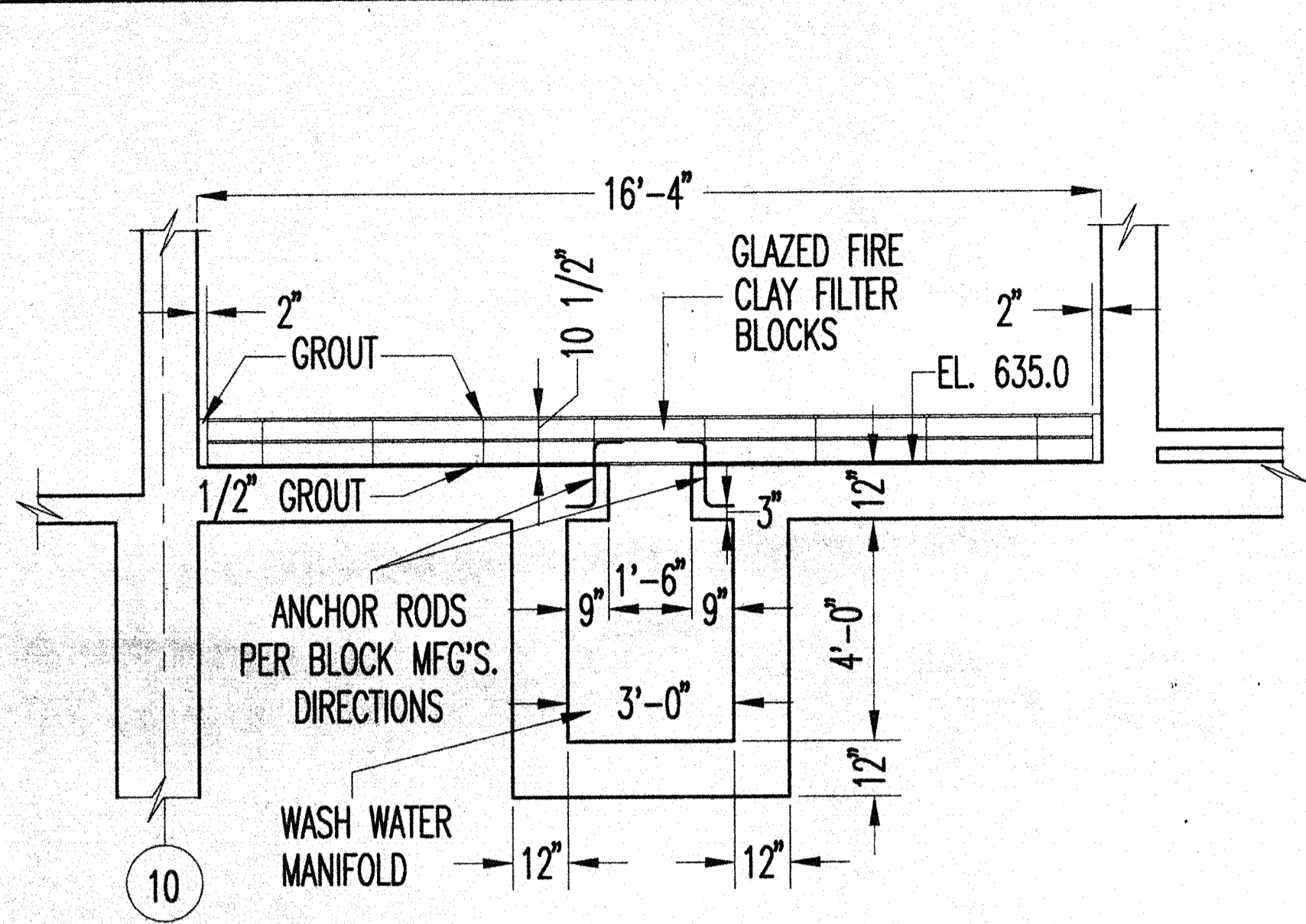
DULUTH WATER  
TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA  
PLAN-PIPING BELOW 630'-0"

DATE	AUG. 91
W.O. No.	9126
SHEET NO.	23
OF	46

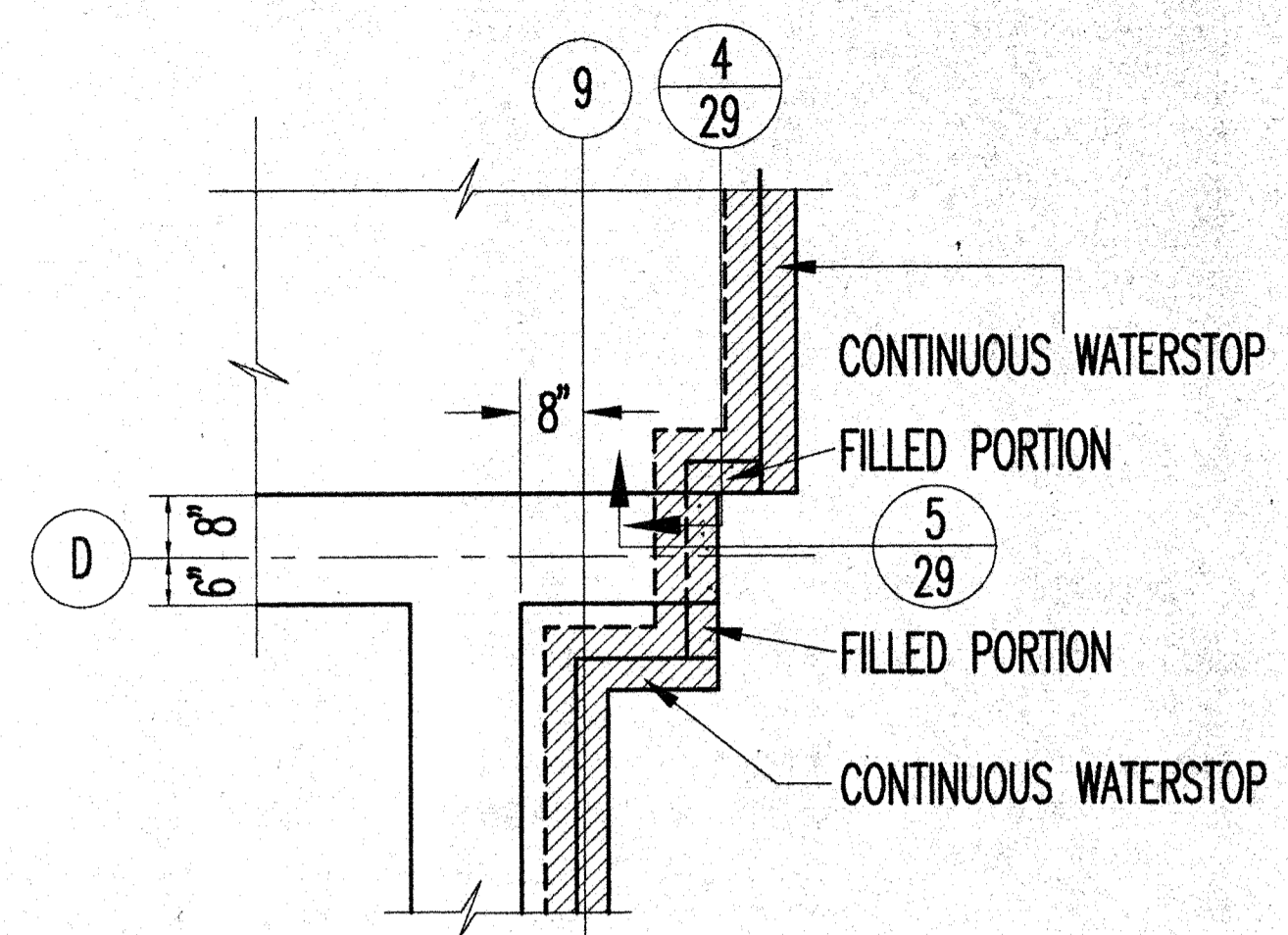
**RECORD DRAWING**

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plot view: 1  
plot scale: 1/8"  
width:

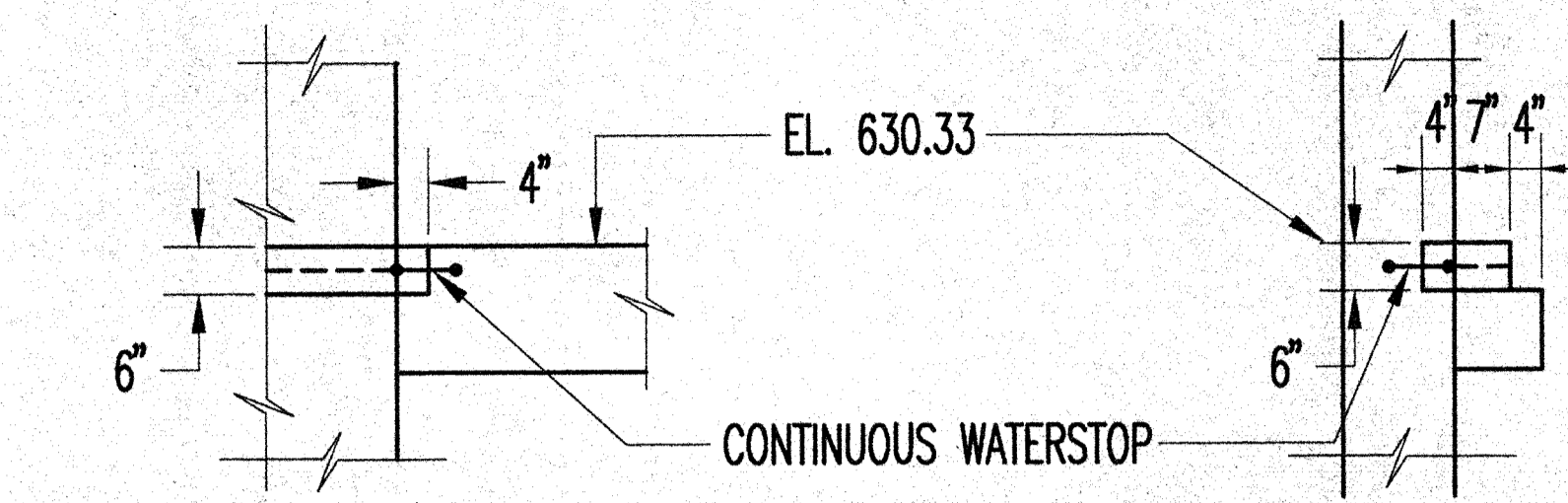




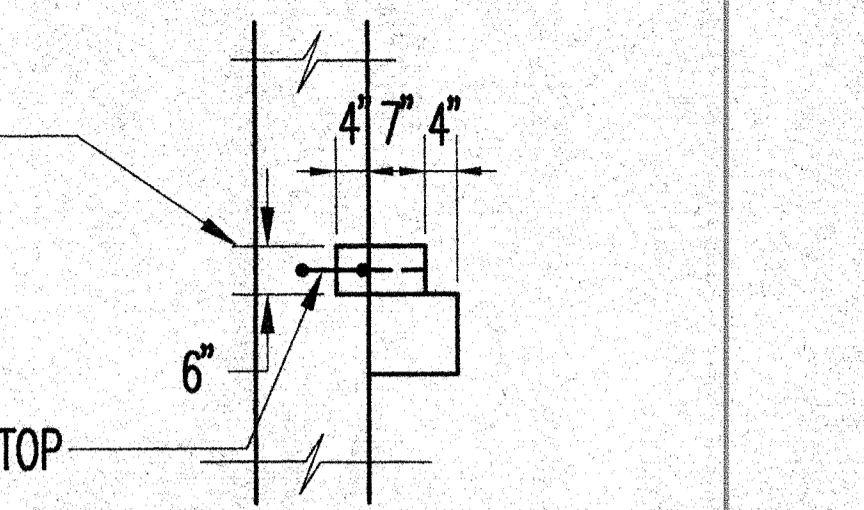
SECTION 1  
SCALE: 3/8" = 1'-0"



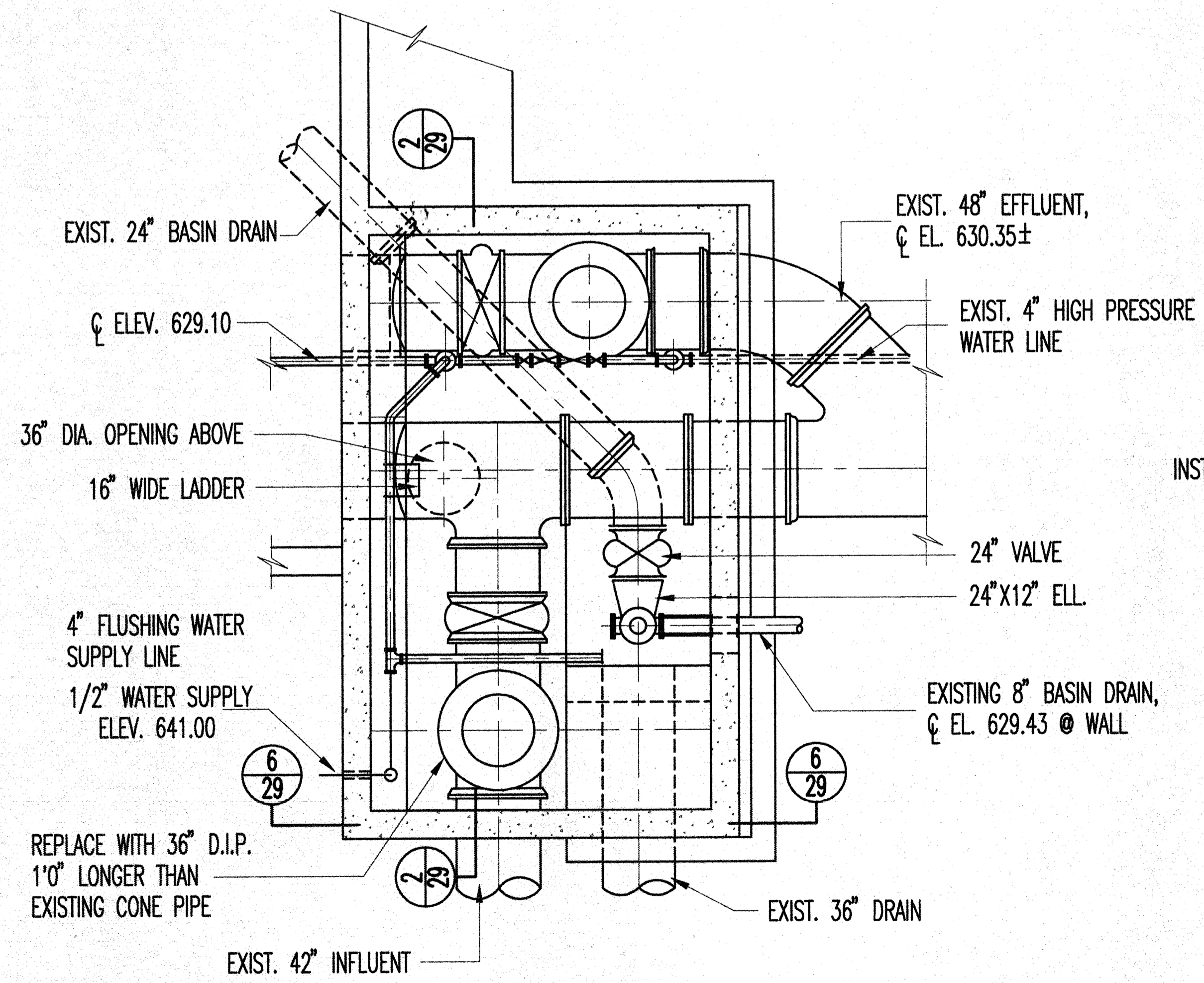
SECTIONAL PLAN EL. 630.33 3  
SCALE: 1/2" = 1'-0"



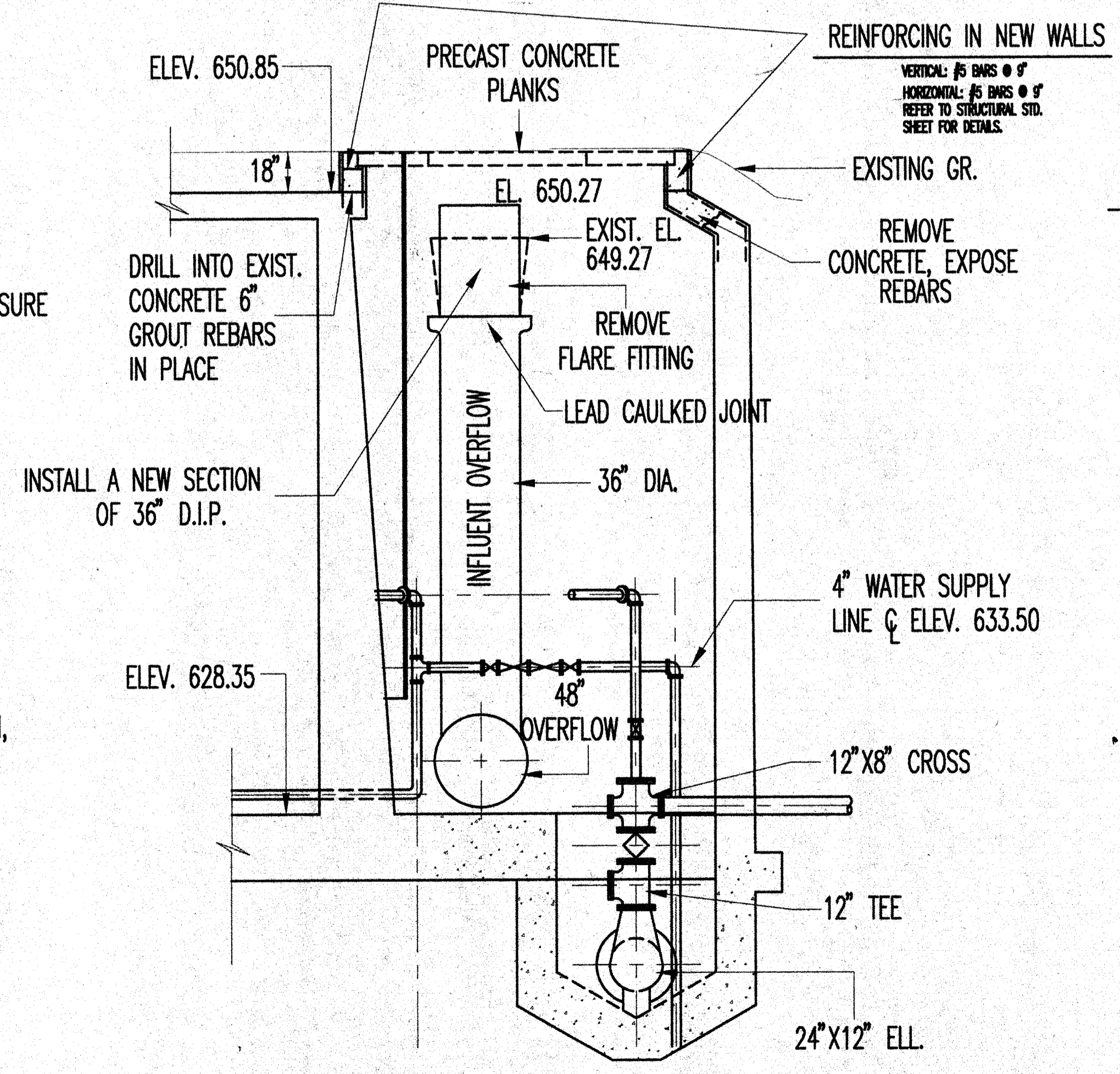
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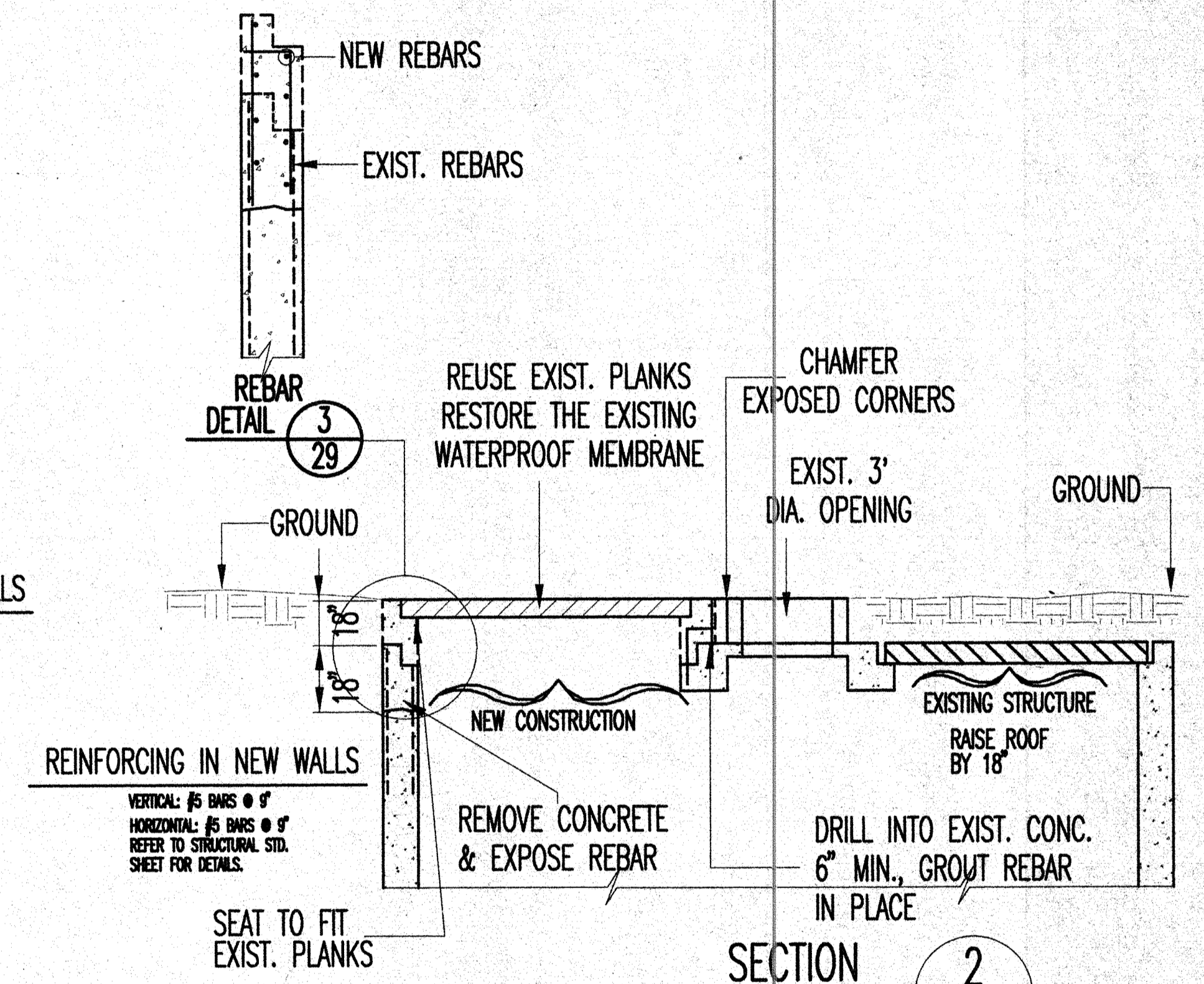
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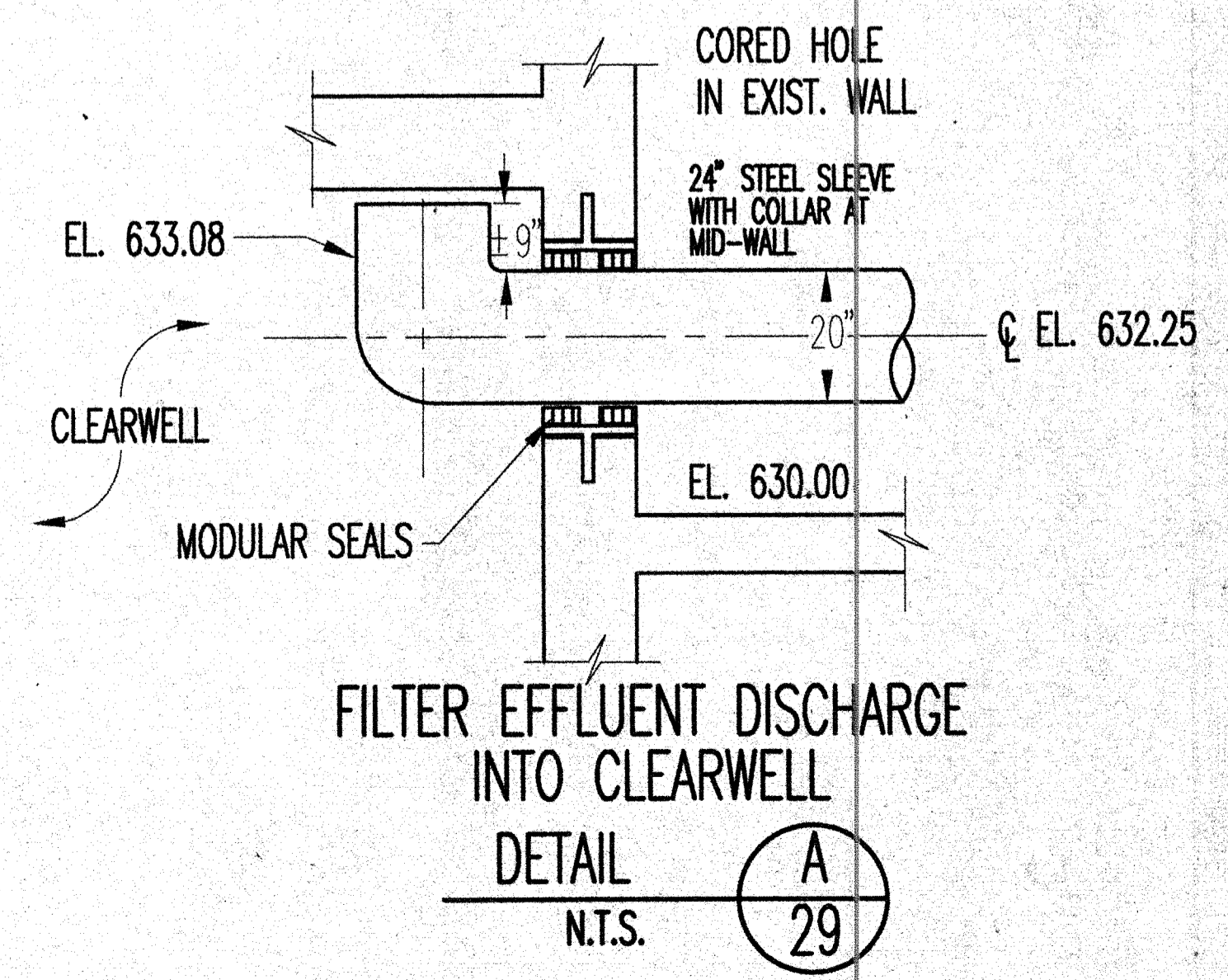
EXISTING BASIN EFFLUENT STRUCTURE  
SECTIONAL PLAN  
SCALE: 1/4" = 1'-0"



SECTION 6  
SCALE: 1/4" = 1'-0"



SECTION 2  
N.T.S.



DETAIL A  
N.T.S.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly registered professional engineer in the state of Minnesota.

DESIGNED BY: VJG  
DRAWN BY: MAN  
CHECKED BY: GLE  
SURVEYED BY: RREM  
SCALE: AS NOTED

408 BOARD OF TRADE BUILDING  
DULUTH, MINNESOTA 55802

**RREM, INC.**  
CONSULTING ENGINEERS

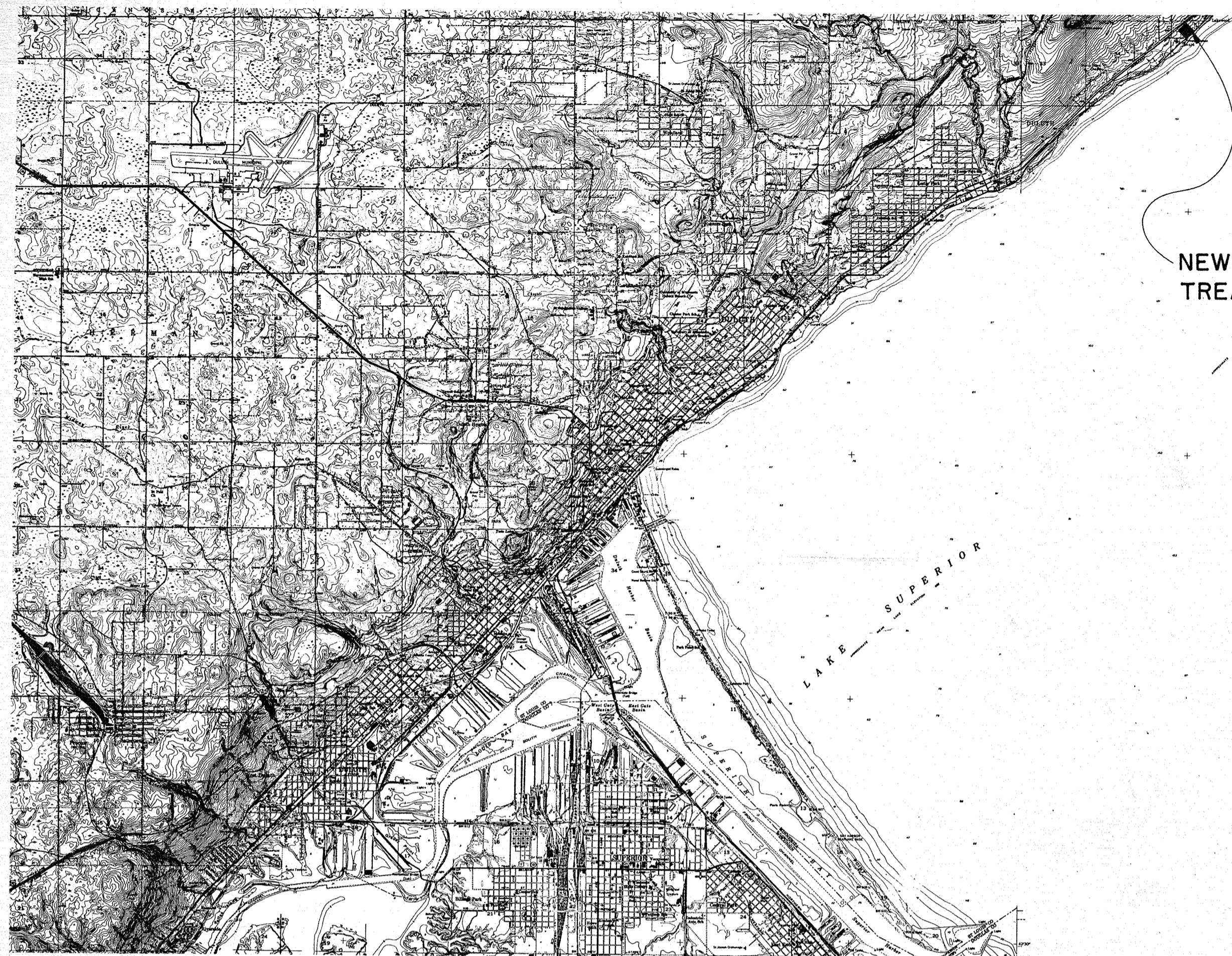
NO.	DATE	DESCRIPTION	REVISIONS
1	12/22/98	REVISED TO RECORD DRAWING	

DULUTH WATER  
TREATMENT PLANT EXPANSION  
DULUTH, MINNESOTA  
EFFLUENT STRUCTURE MODIFICATIONS

DATE: 7-18-91  
V.D. No. 9126  
SHEET NO. 29 OF 46

RECORD DRAWING

File name: 912602  
Plot scale: 1/4" = 1'-0"  
User: WNF



NEW 30.0 M.G.D. WATER  
TREATMENT PLANT

# DULUTH, MINNESOTA WATER WORKS IMPROVEMENTS

## WATER TREATMENT PLANT

CONTRACT NO. 2

*Sheet 36 missing*

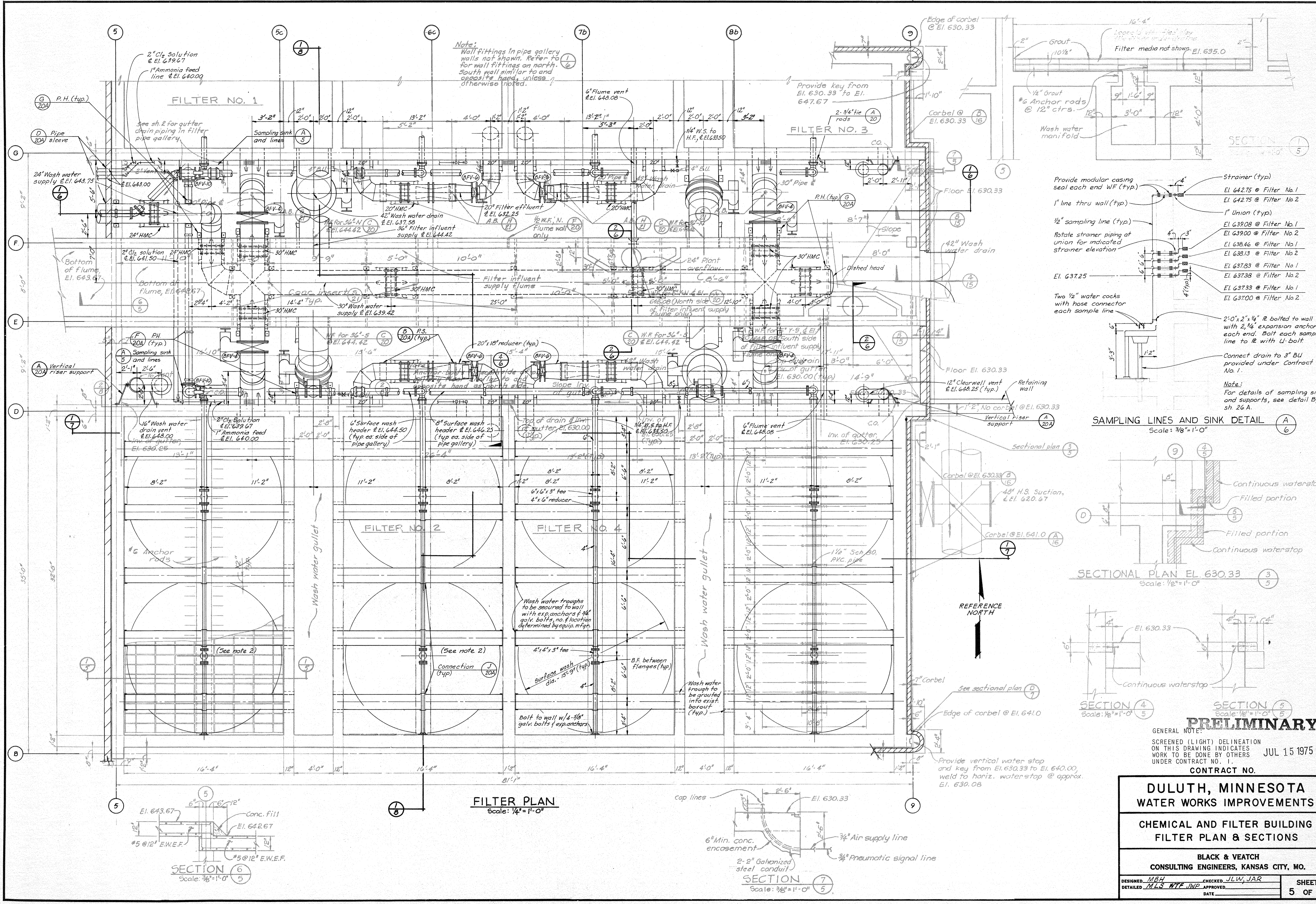
**BLACK & VEATCH  
CONSULTING ENGINEERS  
KANSAS CITY, MISSOURI  
1975**

SHEET INDEX

SHEET NO.	SHEET DESIGNATION OR TITLE	SHEET NO.	SHEET DESIGNATION OR TITLE	SHEET NO.	SHEET DESIGNATION OR TITLE
1	WATER TREATMENT PLANT - GENERAL LAYOUT	24	WASH WATER RECOVERY FACILITIES - PLAN	54	CHEMICAL AND FILTER BUILDING - STAIR AND ENTRANCE PLANS
2	CHEMICAL AND FILTER BUILDING - FOUNDATION PLAN	25	WASH WATER RECOVERY FACILITIES - CONCRETE SECTIONS	55	CHEMICAL AND FILTER BUILDING - STAIR AND ELEVATOR SECTIONS
3	CHEMICAL AND FILTER BUILDING - FIRST FLOOR PLAN	26	WASH WATER RECOVERY FACILITIES - CONCRETE SECTIONS AND DETAILS	56	CHEMICAL AND FILTER BUILDING - STAIR AND ELEVATOR DETAILS
4	CHEMICAL AND FILTER BUILDING - OPERATING FLOOR PLAN	26A	WASH WATER RECOVERY FACILITIES - CONCRETE SECTIONS AND DETAILS	57	CHEMICAL AND FILTER BUILDING - MISCELLANEOUS DETAILS
4A	CHEMICAL AND FILTER BUILDING - ROOF PLAN	27	DECANT STORAGE LAGOONS - PLAN	58	CHEMICAL AND FILTER BUILDING - BUILDING SECTIONS
5	CHEMICAL AND FILTER BUILDING - FILTER PLAN AND SECTIONS	28	DECANT STORAGE LAGOONS - SECTIONS AND DETAILS	59	WASH WATER RECOVERY FACILITIES - ELEVATIONS AND WALL SECTIONS
6	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	28A	SEPTIC TANK AND DRAIN FIELD	60	WASH WATER RECOVERY FACILITIES - PLANS AND DETAILS
7	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	29	STANDARD CONCRETE DETAILS	61	HEATING, VENTILATING AND AIR CONDITIONING - FIRST FLOOR PLAN
8	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	30	YARD WORK - PLANS AND DETAILS	62	HEATING, VENTILATING AND AIR CONDITIONING - OPERATING FLOOR PLAN
9	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	31	YARD WORK - PLANS AND DETAILS	63	HEATING, VENTILATING AND AIR CONDITIONING - MECHANICAL ROOMS, PLANS, AND SECTIONS
10	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	32	PLANTINGS PLAN	64	HEATING, VENTILATING AND AIR CONDITIONING - FLOW DIAGRAMS
11	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	33	FLOCCULATION FACILITIES - PLAN	65	HEATING, VENTILATING AND AIR CONDITIONING - TEMPERATURE CONTROL DIAGRAMS
12	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	34	FLOCCULATION FACILITIES - ELEVATIONS AND SECTIONS	66	HEATING, VENTILATING AND AIR CONDITIONING - WASH WATER RECOVERY FACILITIES
13	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	35	FLOCCULATION FACILITIES - ELEVATIONS AND SECTIONS	67	HEATING, VENTILATING AND AIR CONDITIONING - FLOCCULATION FACILITIES
14	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	36	FLOCCULATION FACILITIES - SECTIONS AND DETAILS	68	HEATING, VENTILATING AND AIR CONDITIONING - DETAILS
15	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	37	FLOCCULATION FACILITIES - SECTIONS AND DETAILS	69	HEATING, VENTILATING AND AIR CONDITIONING - DETAILS
16	CHEMICAL AND FILTER BUILDING - CONCRETE SECTIONS	38	FLOCCULATION FACILITIES - MISCELLANEOUS DETAILS	70	ELECTRICAL - UNDERGROUND DUCTS AND MANHOLE DETAILS
17	CHEMICAL AND FILTER BUILDING - COLUMN SCHEDULE AND DETAILS	39	CHEMICAL AND FILTER BUILDING - BUILDING ELEVATIONS	71	ELECTRICAL - MOTOR CONTROL CENTER NO. 1
18	CHEMICAL AND FILTER BUILDING - BEAM SCHEDULE AND DETAILS	40	CHEMICAL AND FILTER BUILDING - BUILDING ELEVATIONS	72	ELECTRICAL - MOTOR CONTROL CENTER NO. 2
19	CHEMICAL AND FILTER BUILDING - CORBEL AND MASONRY ANCHOR PLANS	41	CHEMICAL AND FILTER BUILDING - FIRST FLOOR PLAN	73	ELECTRICAL - SCHEMATIC WIRING DIAGRAMS
19A	CHEMICAL AND FILTER BUILDING - CHEMICAL FEED PLAN AND DETAILS	42	CHEMICAL AND FILTER BUILDING - OPERATING FLOOR PLAN	74	ELECTRICAL - FIRST FLOOR POWER WIRING
19B	CHEMICAL AND FILTER BUILDING - CHEMICAL STORAGE PLAN AND DETAILS	43	CHEMICAL AND FILTER BUILDING - ROOF PLAN	75	ELECTRICAL - OPERATING FLOOR POWER WIRING
19C	CHEMICAL AND FILTER BUILDING - CHEMICAL FEED SCHEMATICS	44	CHEMICAL AND FILTER BUILDING - WALL SECTIONS	76	ELECTRICAL - PIPE GALLERY LIGHTING AND POWER WIRING
20	CHEMICAL AND FILTER BUILDING - WALL FITTING DETAILS	45	CHEMICAL AND FILTER BUILDING - WALL SECTIONS	77	ELECTRICAL - FIRST FLOOR LIGHTING
20A	CHEMICAL AND FILTER BUILDING - PIPE SUPPORT DETAILS	46	CHEMICAL AND FILTER BUILDING - WALL SECTIONS	78	ELECTRICAL - OPERATING FLOOR LIGHTING
21	CHEMICAL AND FILTER BUILDING - MISCELLANEOUS DETAILS	47	CHEMICAL AND FILTER BUILDING - WALL SECTIONS	79	ELECTRICAL - WASH WATER RECOVERY AND FLOCCULATION FACILITIES
21A	CHEMICAL AND FILTER BUILDING - MISCELLANEOUS DETAILS	48	CHEMICAL AND FILTER BUILDING - DOOR, WINDOW, AND LOUVER SCHEDULE	80	ELECTRICAL - INSTRUMENTATION
22	CHEMICAL AND FILTER BUILDING - PLUMBING DETAILS	49	CHEMICAL AND FILTER BUILDING - DOOR, WINDOW, AND LOUVER DETAILS	81	ELECTRICAL - FILTER CONTROL
22A	CHEMICAL AND FILTER BUILDING - PLUMBING SCHEMATICS	50	CHEMICAL AND FILTER BUILDING - DOOR, WINDOW, AND LOUVER DETAILS	82	ELECTRICAL - PUMPING STATION SCHEMATICS
22B	CHEMICAL AND FILTER BUILDING - PLUMBING - RESTROOMS	51	CHEMICAL AND FILTER BUILDING - REFLECTED CEILING PLANS	83	ELECTRICAL - PUMPING STATION FLOOR PLAN
22C	CHEMICAL AND FILTER BUILDING - PLUMBING - LABORATORY	52	CHEMICAL AND FILTER BUILDING - ENLARGED PLANS		
23	WASH WATER RECOVERY FACILITIES - SECTIONAL PLAN	53	CHEMICAL AND FILTER BUILDING - ENLARGED PLANS		

JUL 15 1975

PRELIMINARY



Note:  
Wall fittings in pipe gallery walls not shown. Refer to for wall fittings on north and south wall similar to and opposite faces, unless otherwise noted.

Provide modular casing seal each end WF (typ.)  
1" line thru wall (typ.)  
1" Union (typ.)  
1/2" sampling line (typ.)  
Rotate strainer piping at union for indicated strainer elevation  
Two 1/2" water cocks with hose connector each sample line

Strainer (typ.)  
El. 642.75 @ Filter No. 1  
El. 642.75 @ Filter No. 2  
1" Union (typ.)  
El. 639.08 @ Filter No. 1  
El. 639.08 @ Filter No. 2  
El. 638.46 @ Filter No. 1  
El. 638.13 @ Filter No. 2  
El. 637.83 @ Filter No. 1  
El. 637.38 @ Filter No. 2  
El. 637.33 @ Filter No. 1  
El. 637.00 @ Filter No. 2

2'-0" x 2'-1/4" R bolted to wall with 2-3/4" expansion anchors each end. Bolt each sample line to R with U-bolt.  
Connect drain to 3" BU provided under Contract No. 1.

Note:  
For details of sampling sink and supports, see detail B, sh. 26 A.

SAMPLING LINES AND SINK DETAIL  
Scale: 3/8" = 1'-0"

SECTIONAL PLAN EL. 630.33  
Scale: 1/2" = 1'-0"

SECTIONAL PLAN EL. 641.0  
Scale: 1/2" = 1'-0"

GENERAL NOTE:  
SCREENED (LIGHT) DELINEATION ON THIS DRAWING INDICATES WORK TO BE DONE BY OTHERS UNDER CONTRACT NO. 1.

CONTRACT NO.

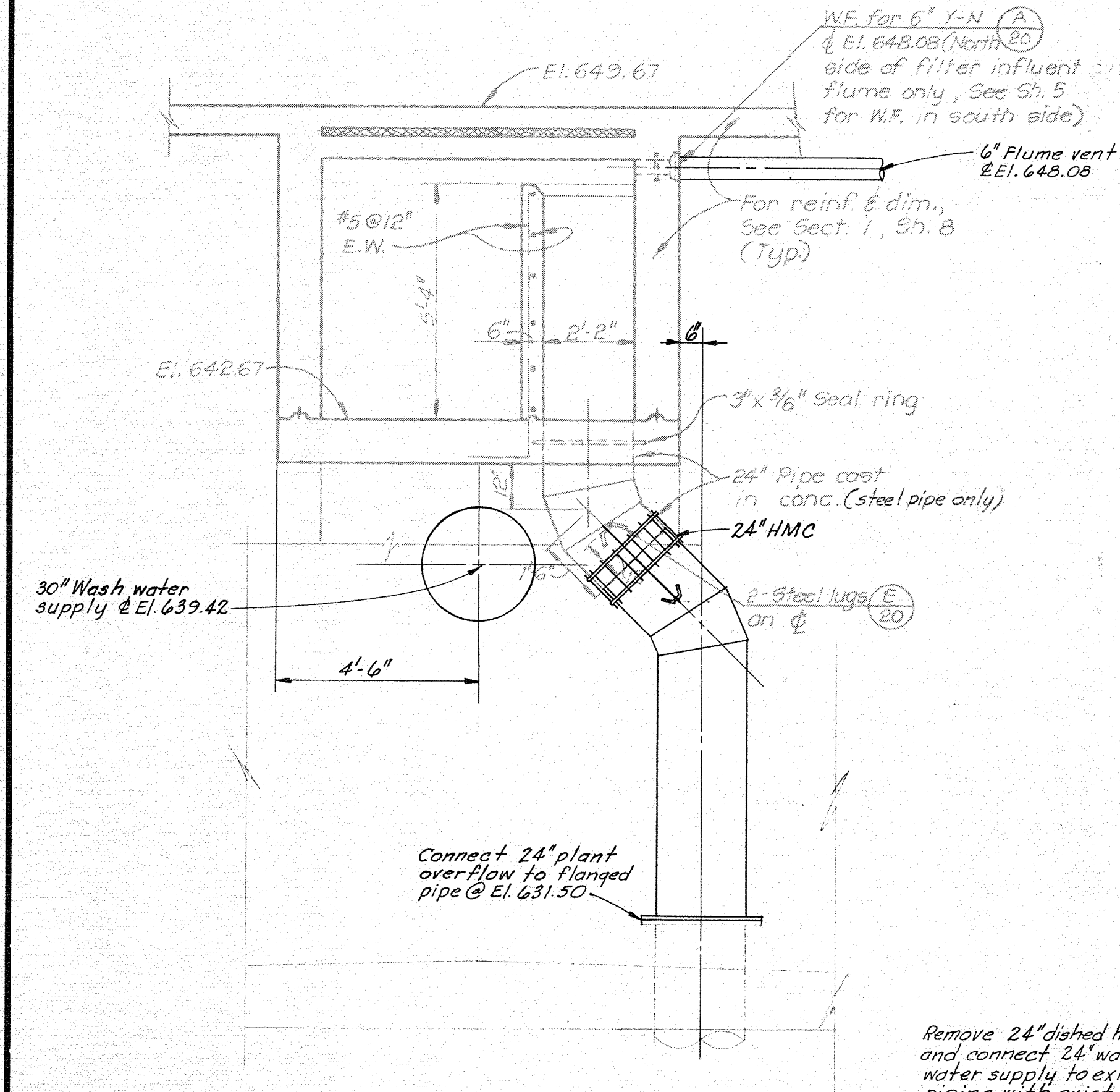
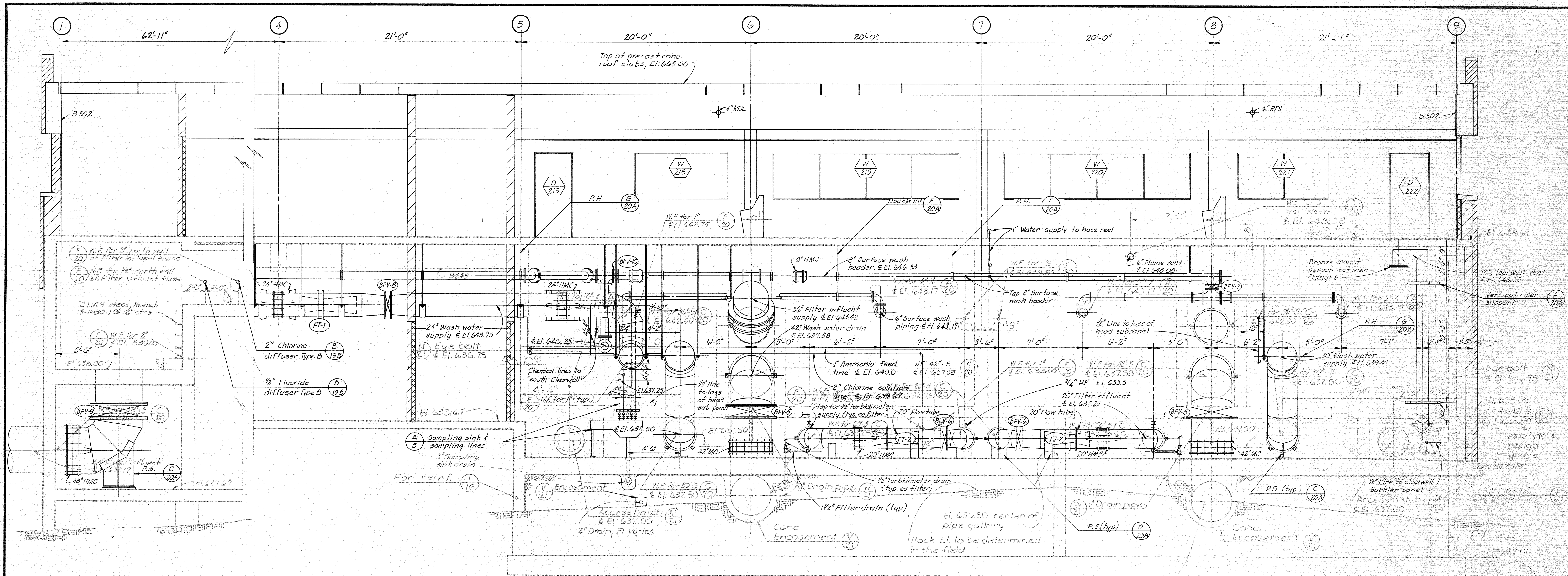
**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

**CHEMICAL AND FILTER BUILDING  
FILTER PLAN & SECTIONS**

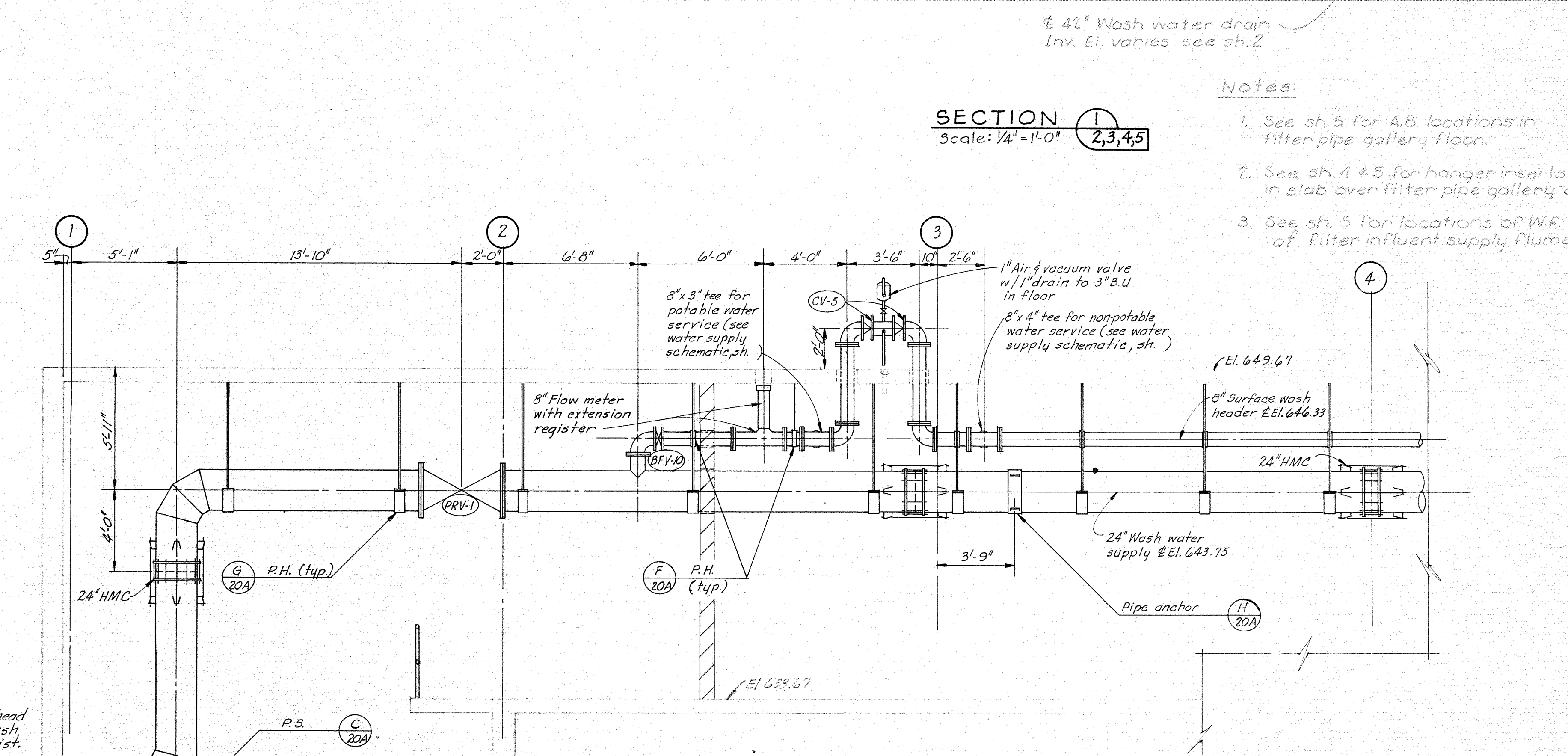
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CONSULTING ENGINEERS, KANSAS CITY, MO.**

DESIGNED MBH  
CHECKED JLW, JAR  
DATE \_\_\_\_\_

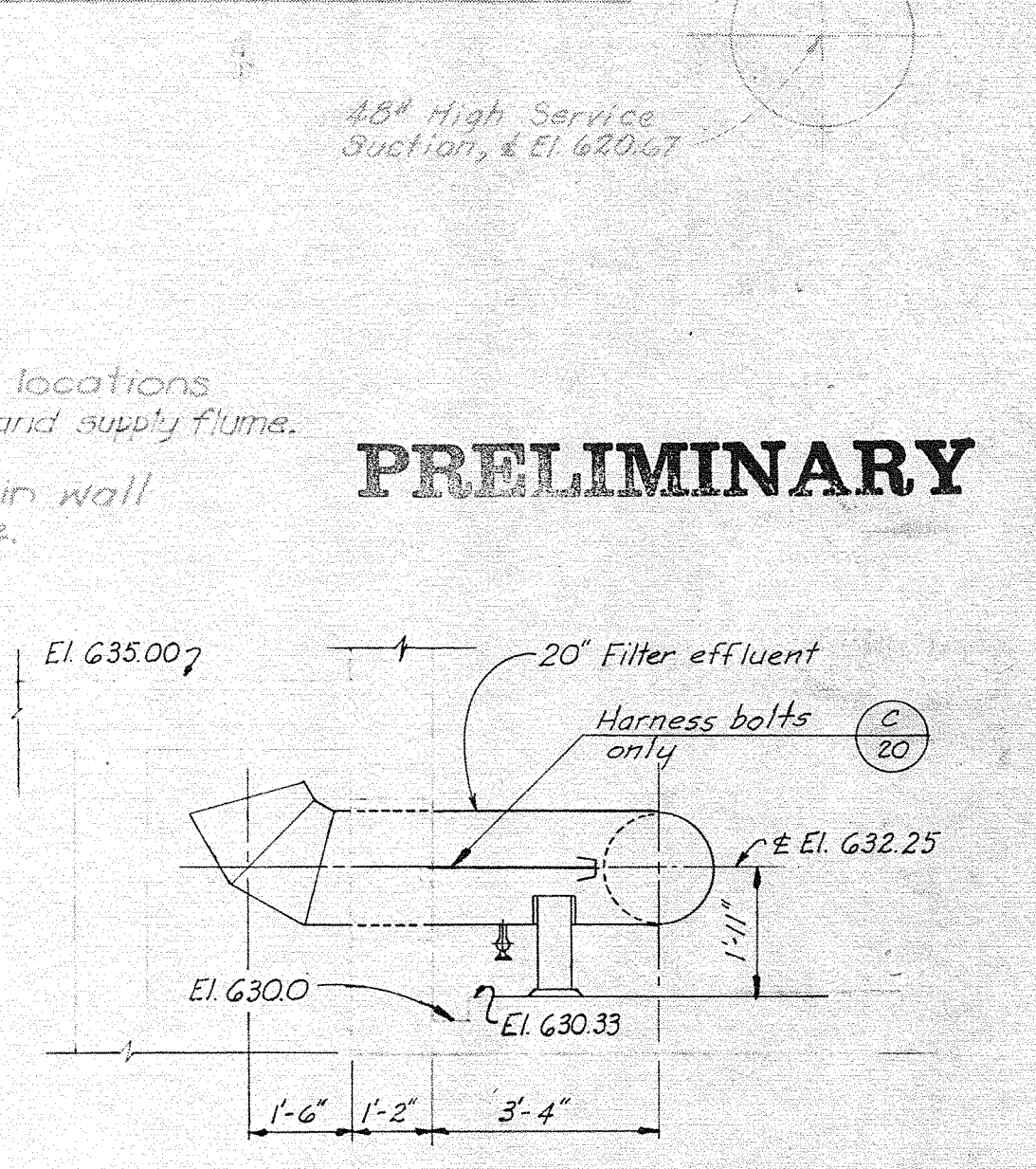
SHEET 5 OF



**SECTION 2**  
Scale: 3/8"=1'-0"



**SECTION 3**  
Scale: 1/4"=1'-0"



**SECTION 4**  
Scale: 3/8"=1'-0"

**SECTION 1**  
Scale: 1/4"=1'-0"

- Notes:**
1. See sh. 5 for A.B. locations in filter pipe gallery floor.
  2. See sh. 4 & 5 for hanger inserts locations in slab over filter pipe gallery and supply flume.
  3. See sh. 5 for locations of W.F. in wall of filter influent supply flume.

**GENERAL NOTE:**  
SCREENED (LIGHT) DELINEATION ON THIS DRAWING INDICATES WORK TO BE DONE BY OTHERS UNDER CONTRACT NO. 1.

**PRELIMINARY**

CONTRACT NO.

**DULUTH, MINNESOTA**  
**WATER WORKS IMPROVEMENTS**

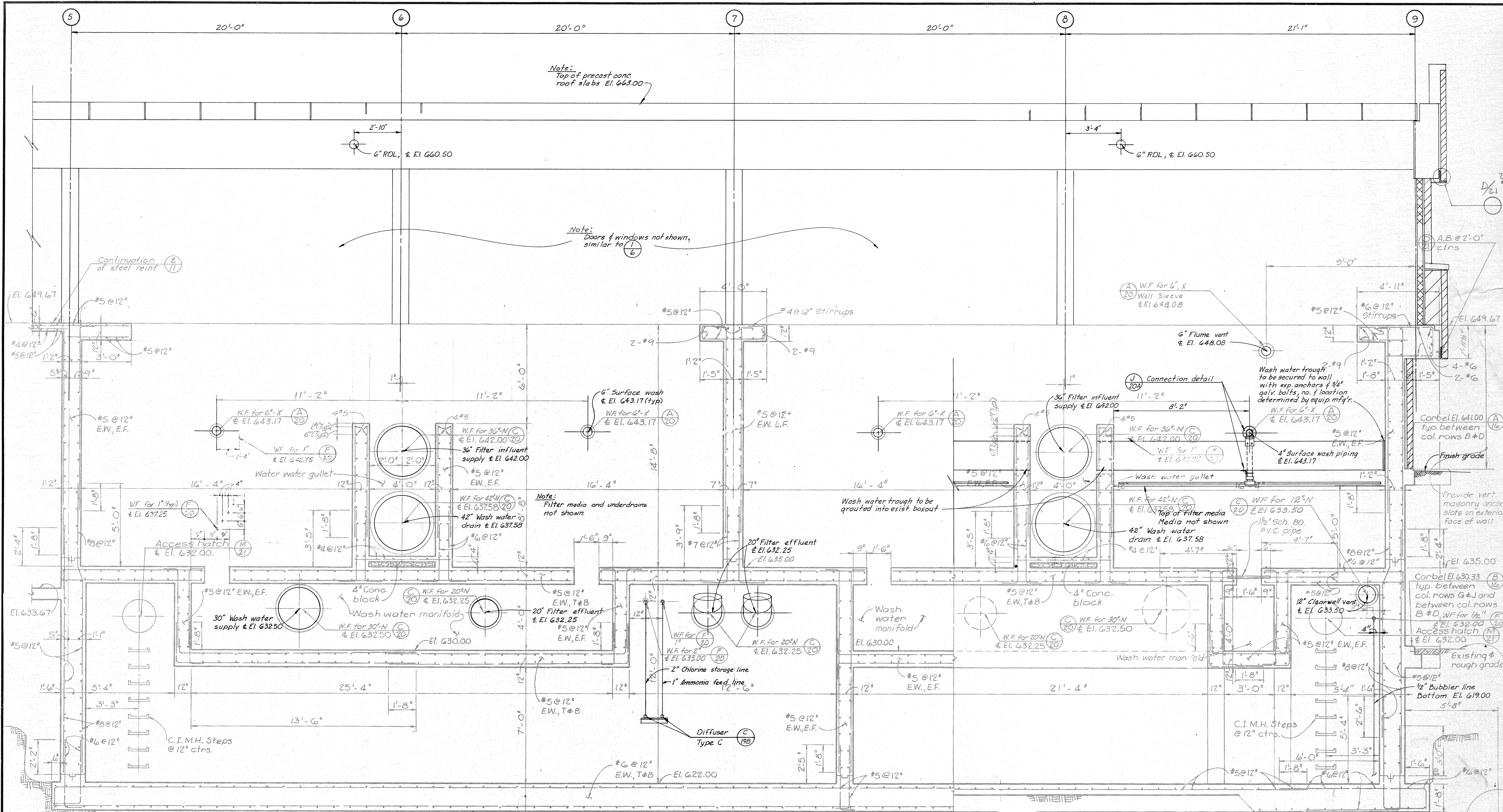
**CHEMICAL AND FILTER BUILDING**  
**CONCRETE SECTIONS**

**BLACK & VEATCH**  
CONSULTING ENGINEERS, KANSAS CITY, MO.

DESIGNED MBH CVH CHECKED J.L.W. JAR  
 DETAILED ODP WTF APPROVED  
 DATE

SHEET  
6 OF

JUL 15 1975



Note:  
Top of precast conc.  
roof slabs El. 663.00

Note:  
Doors & windows not shown,  
similar to (1)

Note:  
Filter media and underdrains  
not shown.

**PRELIMINARY**

GENERAL NOTE:  
SCREENED (LIGHT) DELINEATION  
ON THIS DRAWING INDICATES WORK  
TO BE DONE BY OTHERS  
UNDER CONTRACT NO. 1. CONTRACT NO.

**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

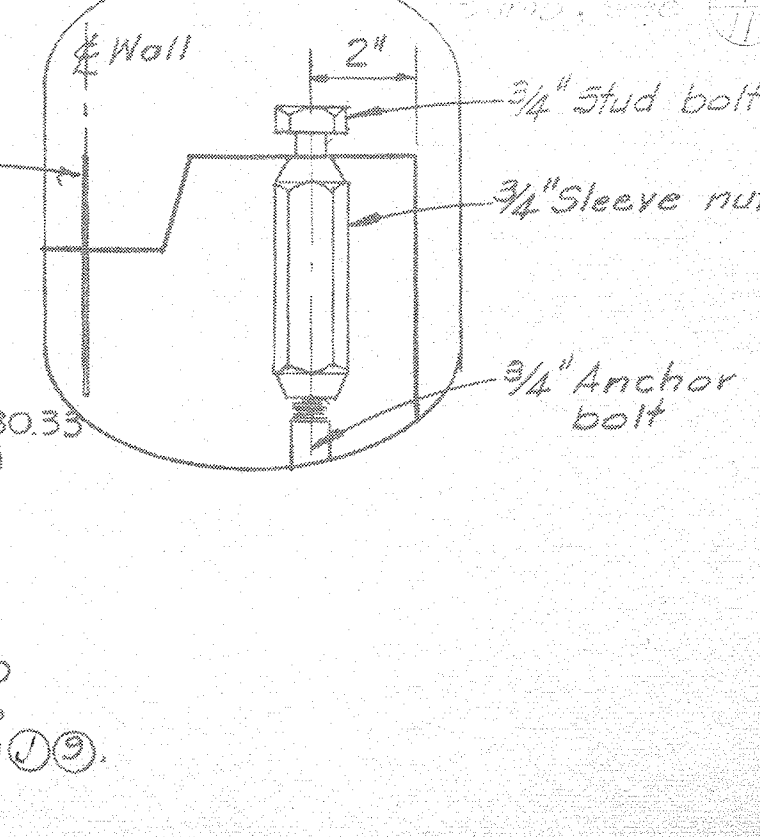
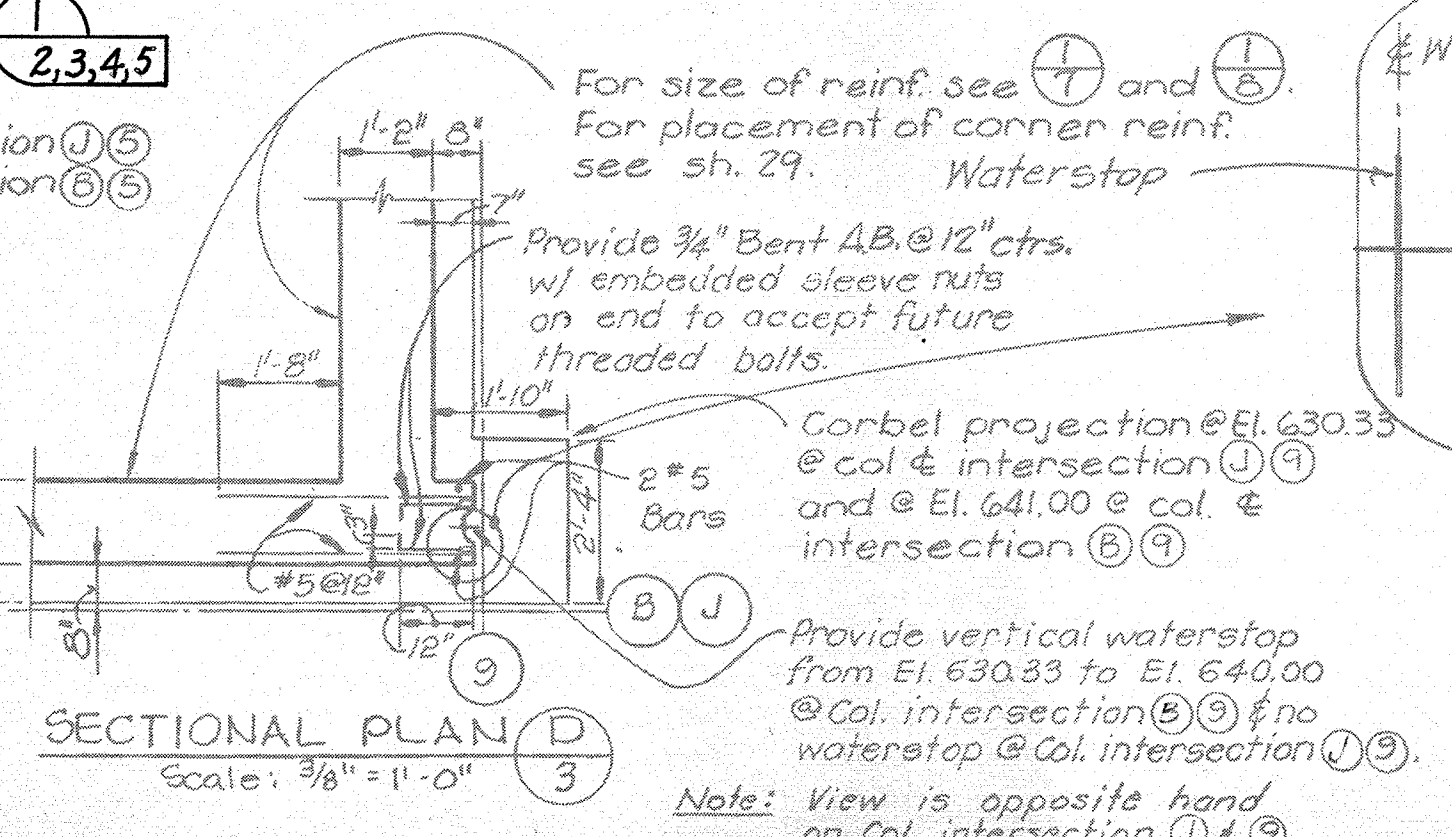
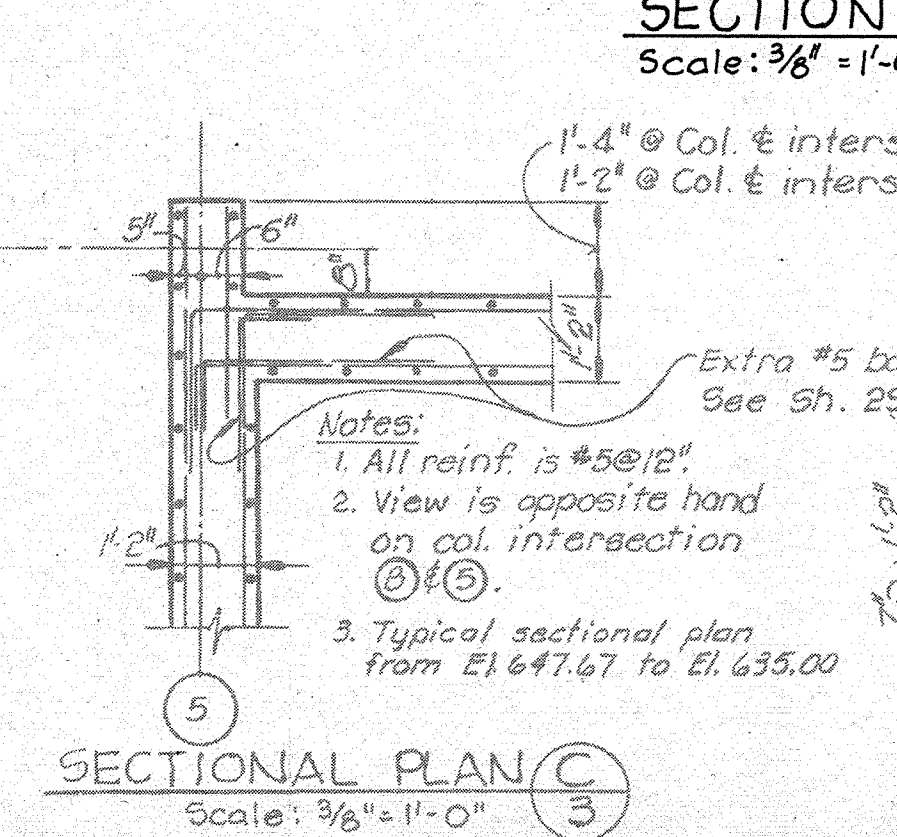
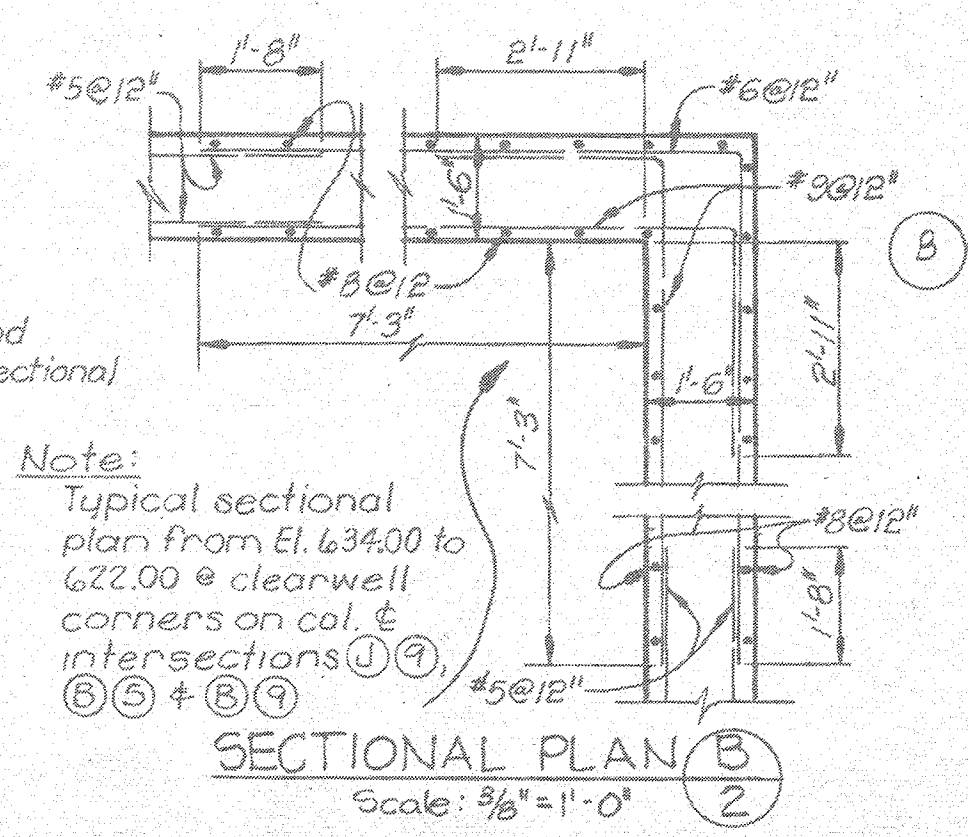
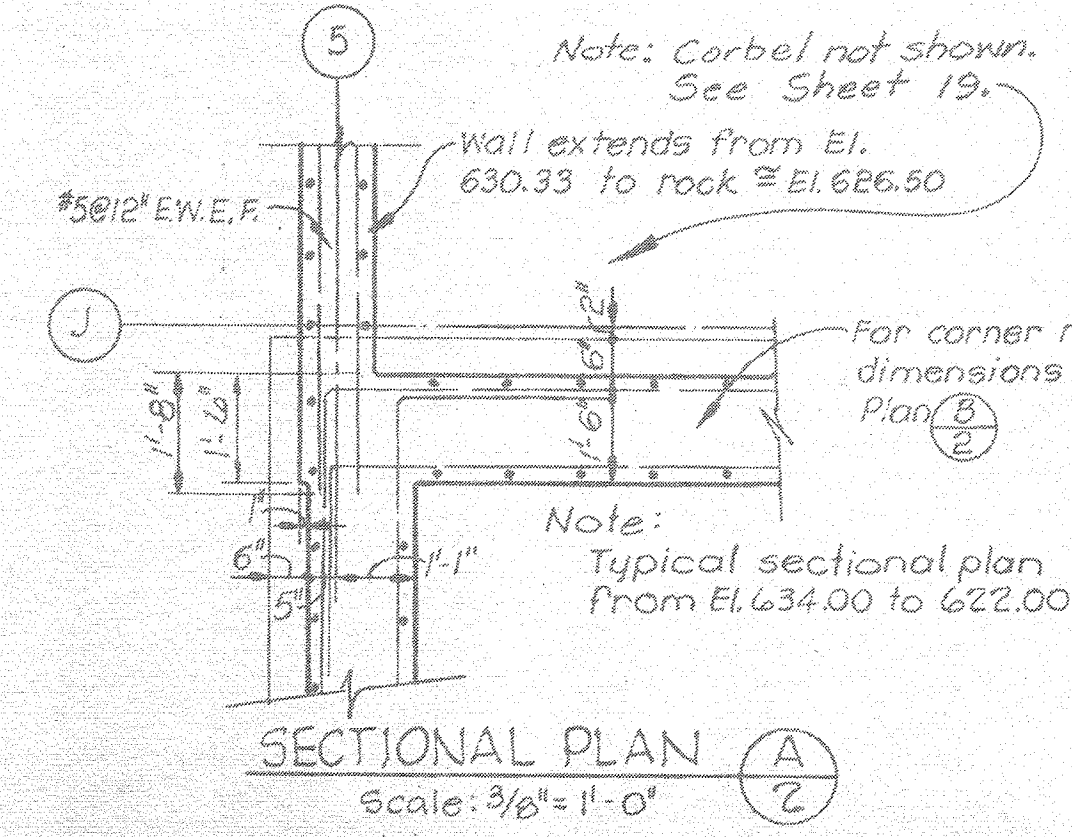
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CONCRETE SECTIONS**

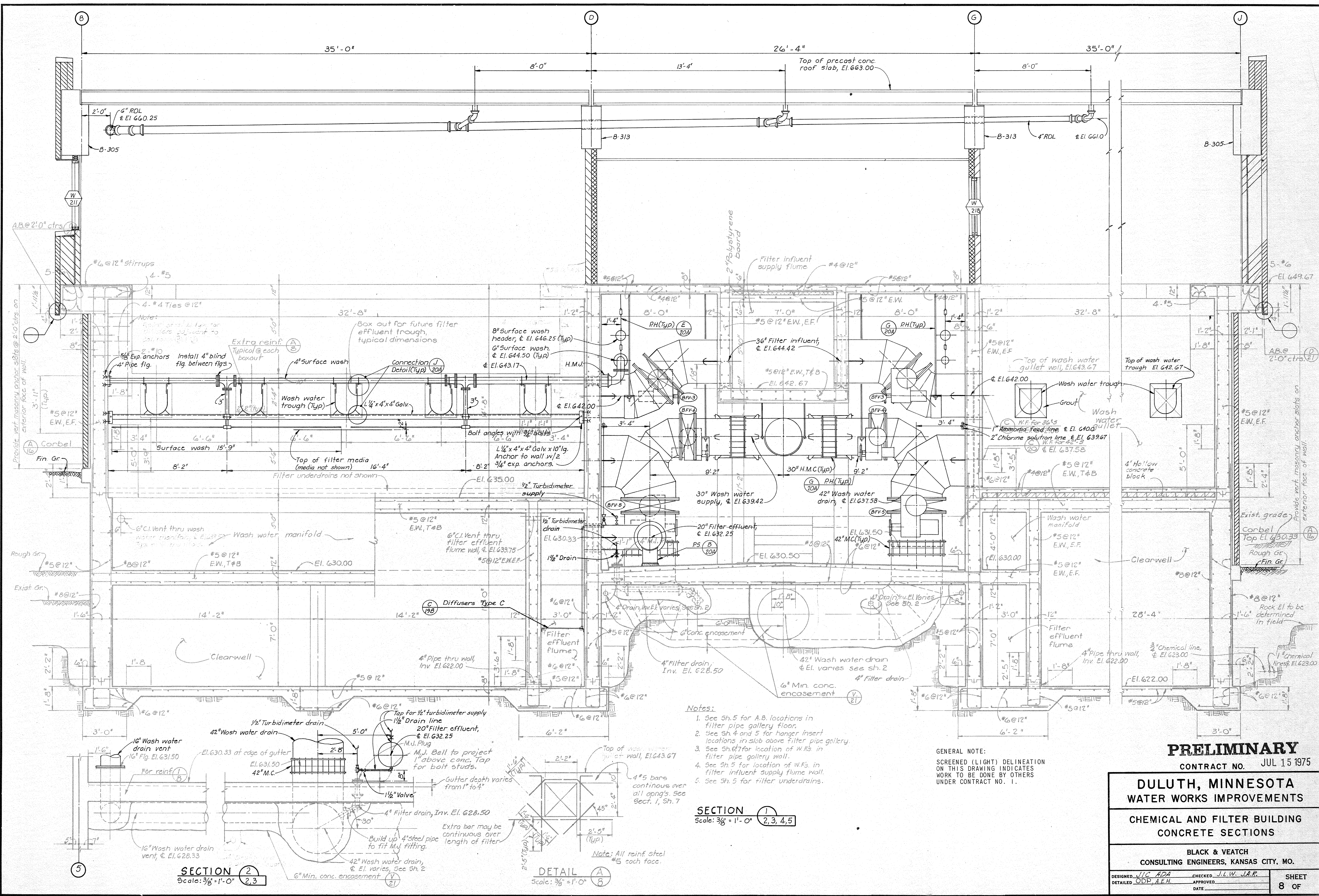
**BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.**

DESIGNED: JIC, ADA  
CHECKED: JLW, JAR  
DATE: \_\_\_\_\_

SHEET  
7 OF

**SECTION 1**  
Scale: 3/8" = 1'-0" (2,3,4,5)





- Notes:**
1. See Sh. 5 for A.B. locations in filter pipe gallery floor.
  2. See Sh. 4 and 5 for hanger insert locations in slab above filter pipe gallery.
  3. See Sh. 6 for location of W.F.s in filter pipe gallery wall.
  4. See Sh. 5 for location of W.F.s in filter influent supply flume wall.
  5. See Sh. 5 for filter underdrains.

**GENERAL NOTE:**  
 SCREENED (LIGHT) DELINEATION ON THIS DRAWING INDICATES WORK TO BE DONE BY OTHERS UNDER CONTRACT NO. 1.

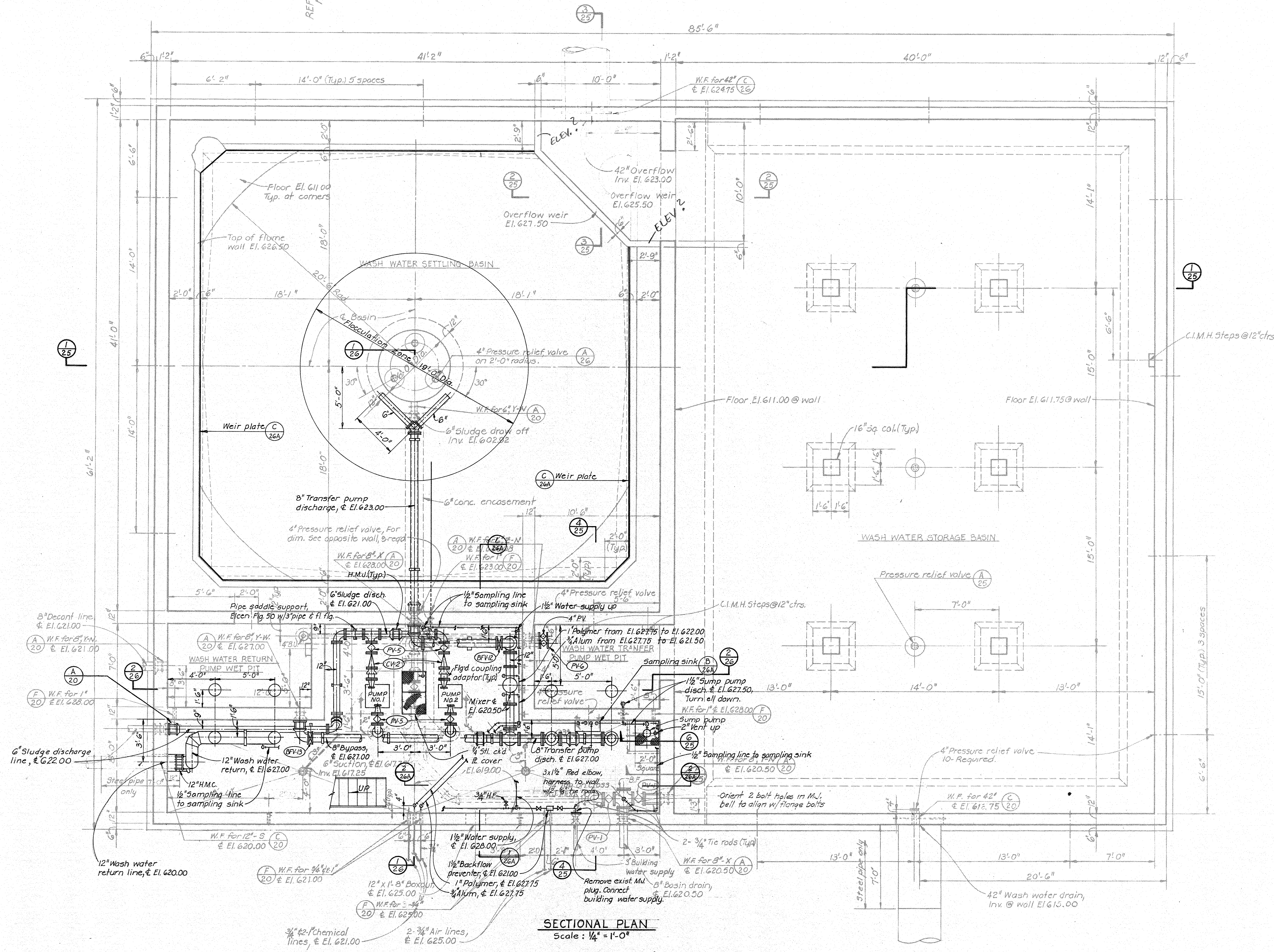
**PRELIMINARY**  
 CONTRACT NO. JUL 15 1975

**DULUTH, MINNESOTA**  
**WATER WORKS IMPROVEMENTS**  
**CHEMICAL AND FILTER BUILDING**  
**CONCRETE SECTIONS**

**BLACK & VEATCH**  
 CONSULTING ENGINEERS, KANSAS CITY, MO.

DESIGNED: JIC, ADA	CHECKED: J.L.W., J.A.P.	SHEET 8 OF
DETAILED: ODP, A.E.H.	APPROVED: DATE	

REFERENCE NORTH



SECTIONAL PLAN  
Scale: 1/4" = 1'-0"

**PRELIMINARY**

GENERAL NOTE:  
SCREENED (LIGHT) DELINEATION  
ON THIS DRAWING INDICATES  
WORK TO BE DONE BY OTHERS  
UNDER CONTRACT NO. 1.

JUL 15 1975

CONTRACT NO.

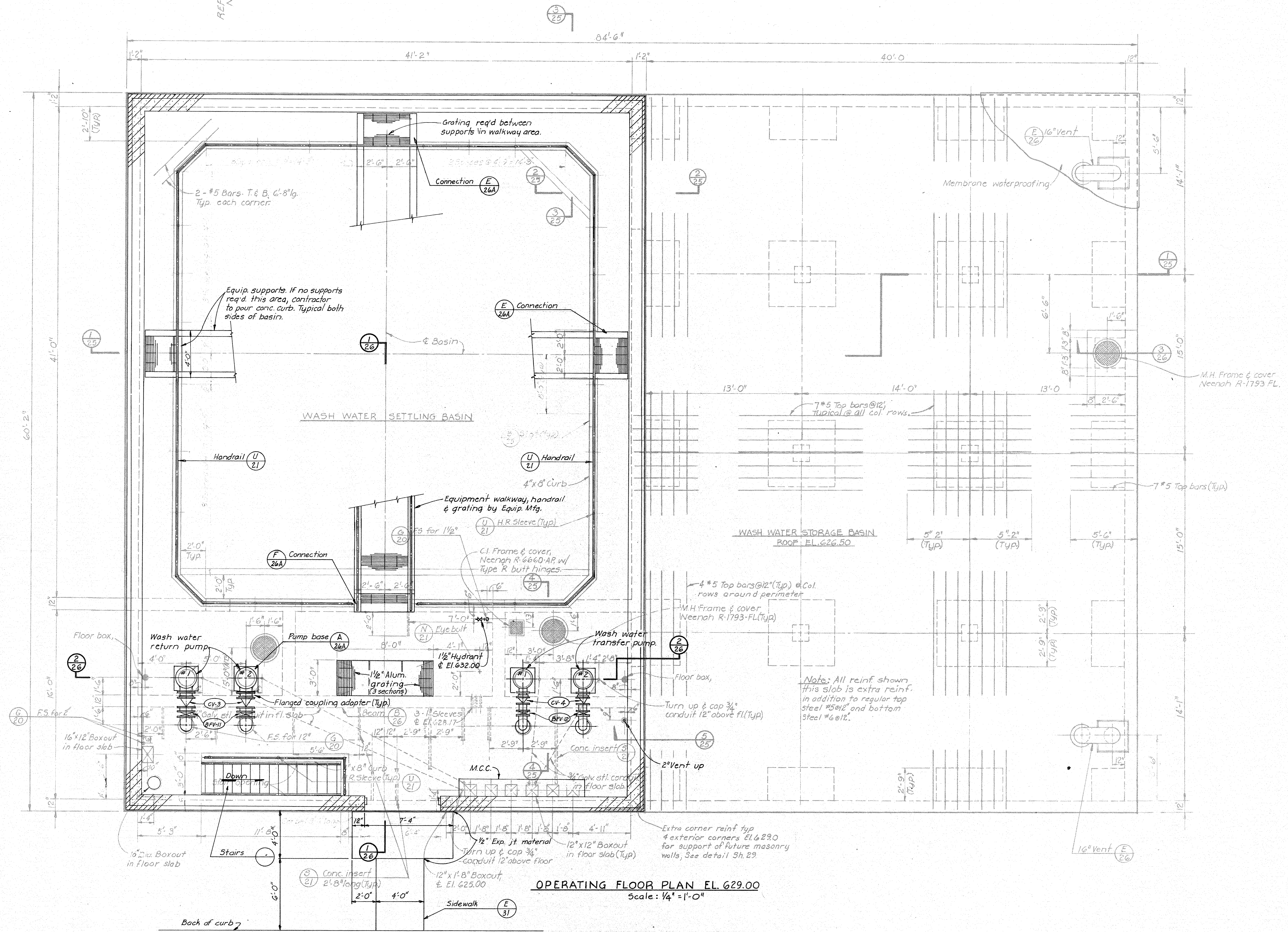
**DULUTH, MINNESOTA  
WATER WORKS IMPROVEMENTS**

**WASH WATER RECOVERY FACILITIES  
SECTIONAL PLAN**

**BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.**

DESIGNED <i>M.P.S.</i>	CHECKED <i>J.A.R.</i>	SHEET 23 OF
DETAILED <i>A.E.H.</i>	APPROVED	
DATE		

REFERENCE NORTH



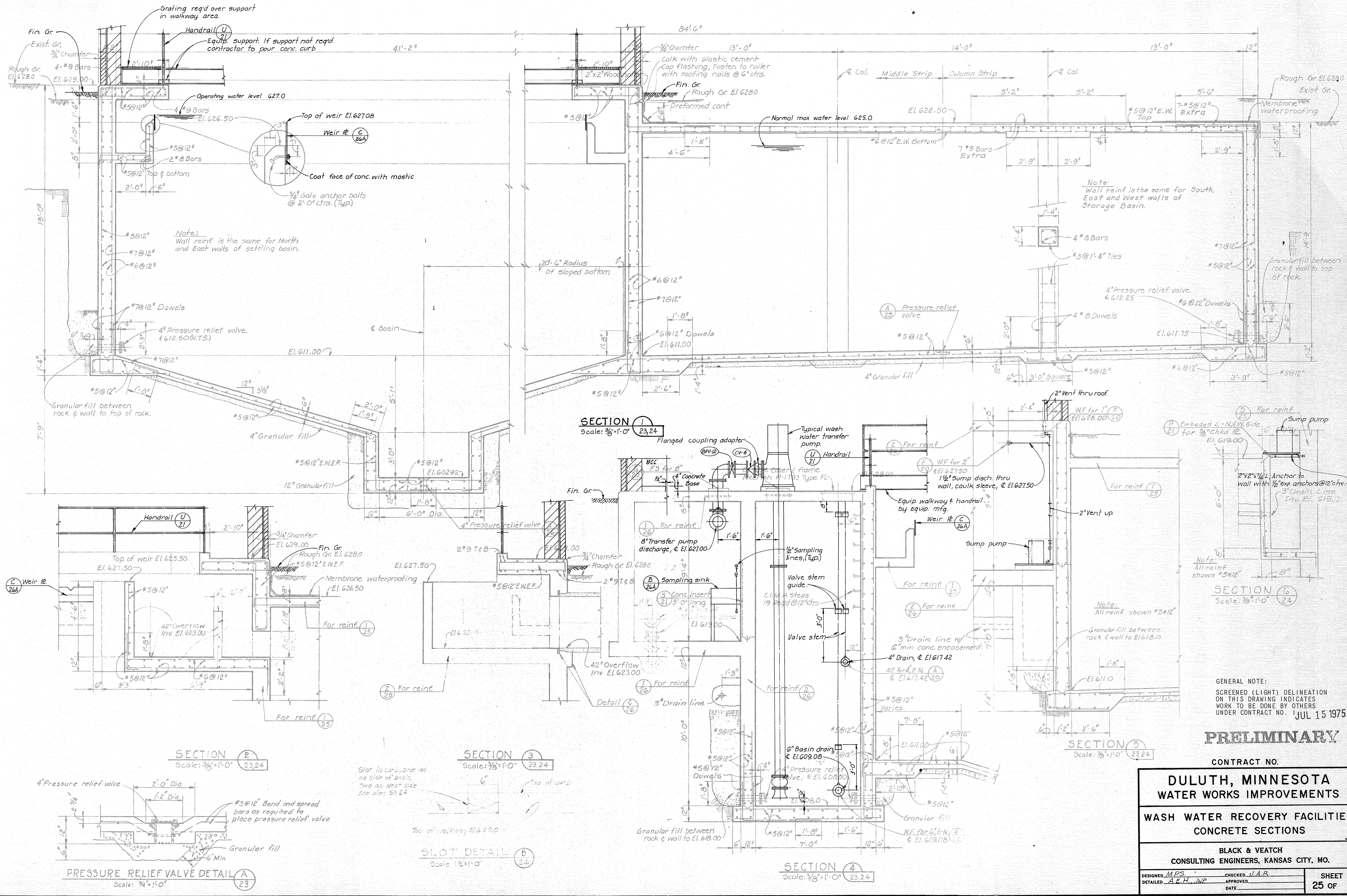
**Note:**  
 Future masonry walls will be built above floor El. 629.00 on the perimeter. Provide extra corner reinforcing on all exterior corners as required by sheet 29 for support of masonry walls.

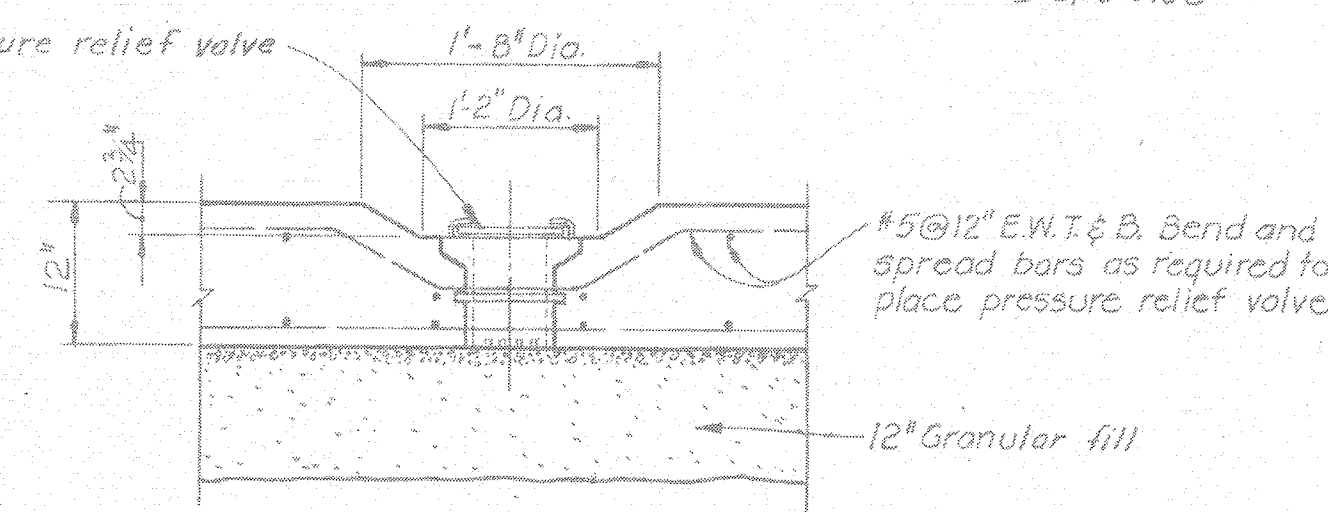
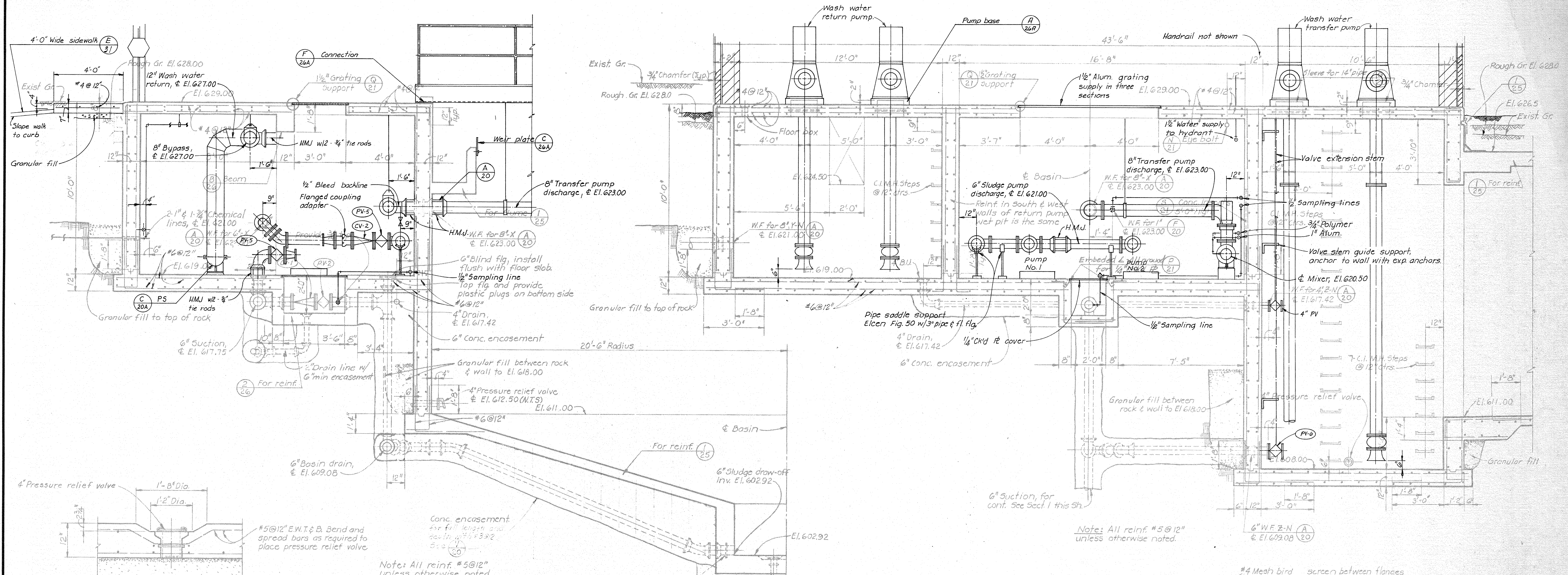
**Note:** All reinf. shown this slab is extra reinf. in addition to regular top steel #5@12" and bottom steel #6@12".

GENERAL NOTE:  
 SCREENED (LIGHT) DELINEATION ON THIS DRAWING INDICATES WORK TO BE DONE BY OTHERS UNDER CONTRACT NO. 1  
**PRELIMINARY**

**OPERATING FLOOR PLAN EL. 629.00**  
 Scale: 1/4" = 1'-0"

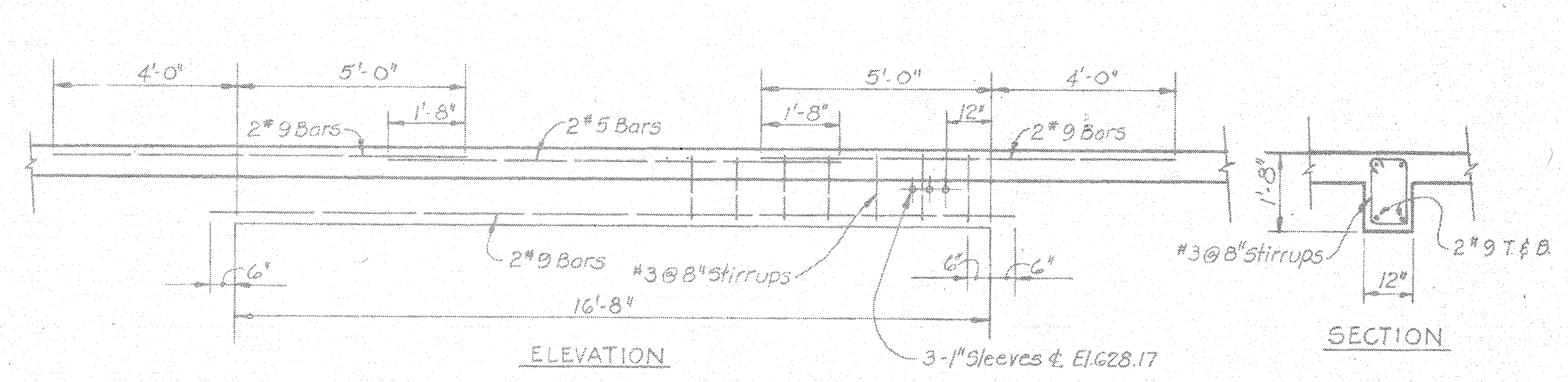
CONTRACT NO.  
**DULUTH, MINNESOTA**  
**WATER WORKS IMPROVEMENTS**  
**WASH WATER RECOVERY FACILITIES**  
**PLAN**  
 BLACK & VEATCH  
 CONSULTING ENGINEERS, KANSAS CITY, MO.  
 DESIGNED M.P.S. CHECKED J.A.R. SHEET  
 DETAILED A.E.H., JWP APPROVED \_\_\_\_\_ DATE \_\_\_\_\_ 24 OF





PRESSURE RELIEF VALVE DETAIL (A)  
Scale: 3/4\"/>

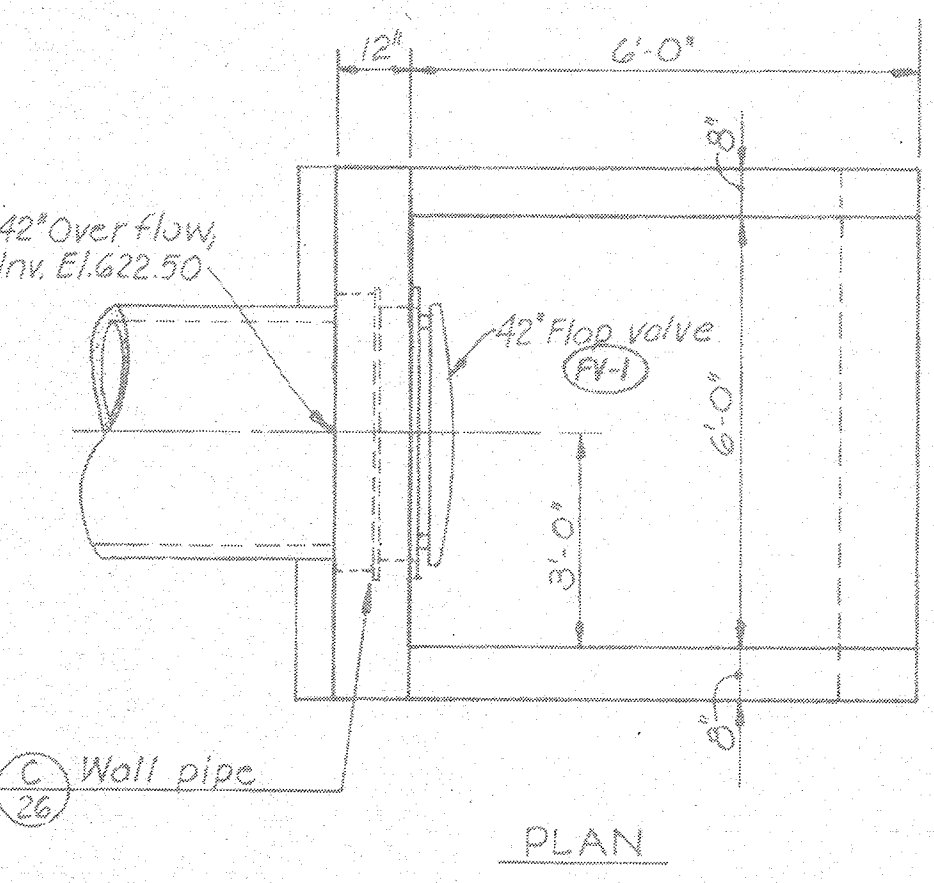
SECTION (1)  
Scale: 3/8\"/>



ELEVATION

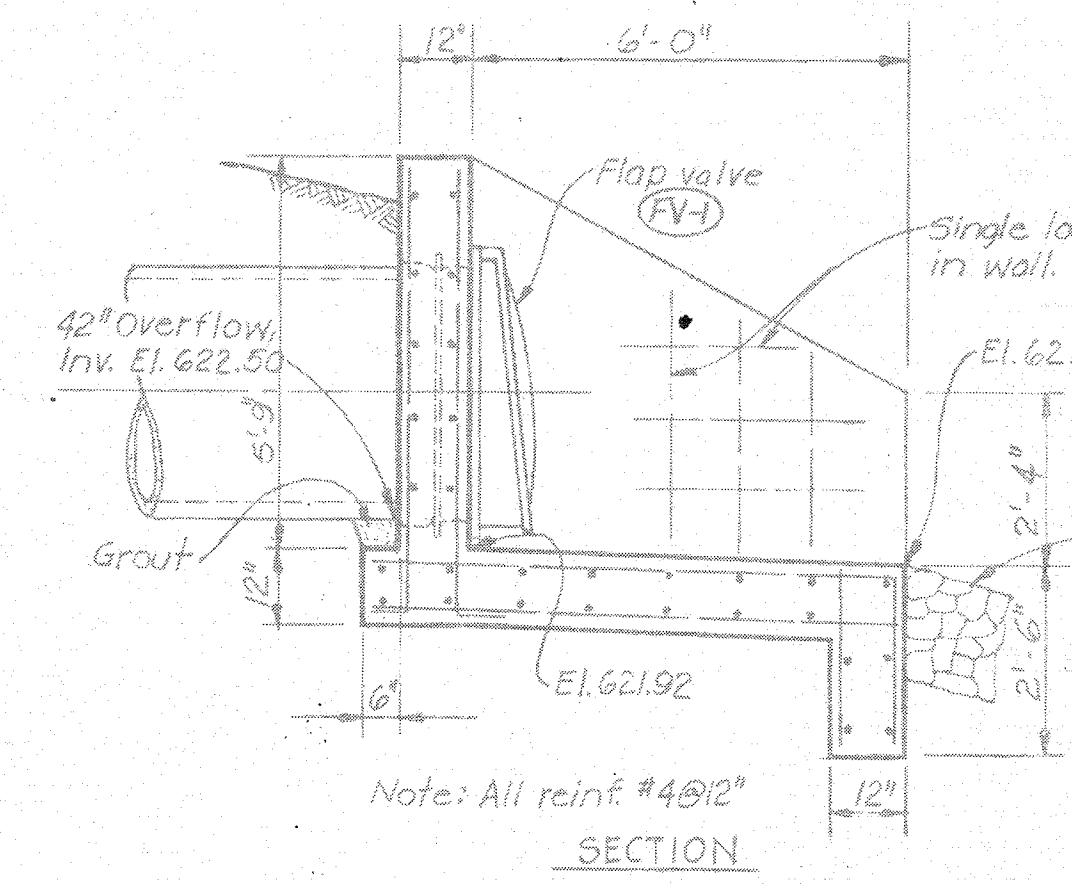
SECTION

BEAM DETAIL (B)  
Scale: 3/8\"/>



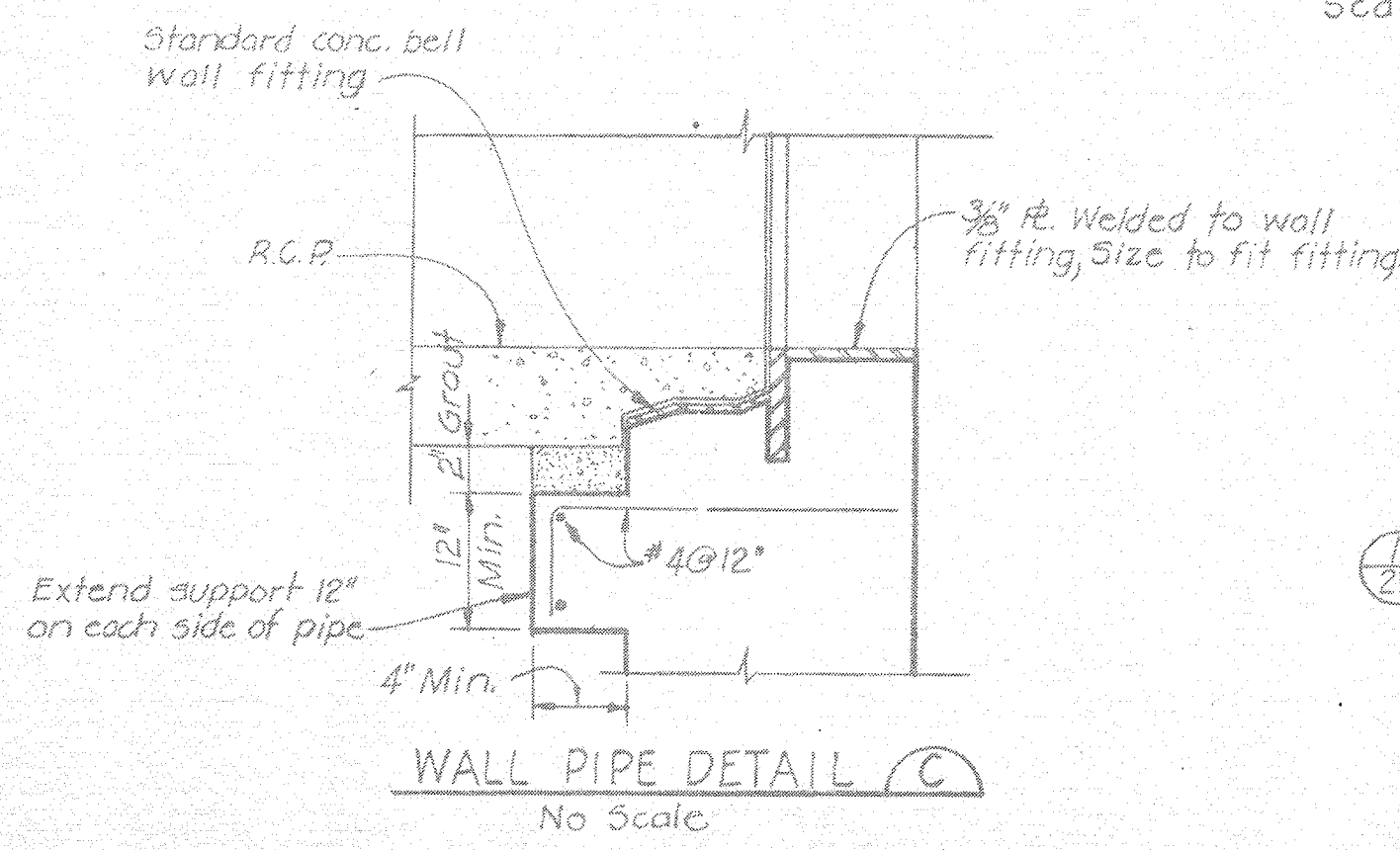
PLAN

HEADWALL DETAIL (D)  
Scale: 3/8\"/>

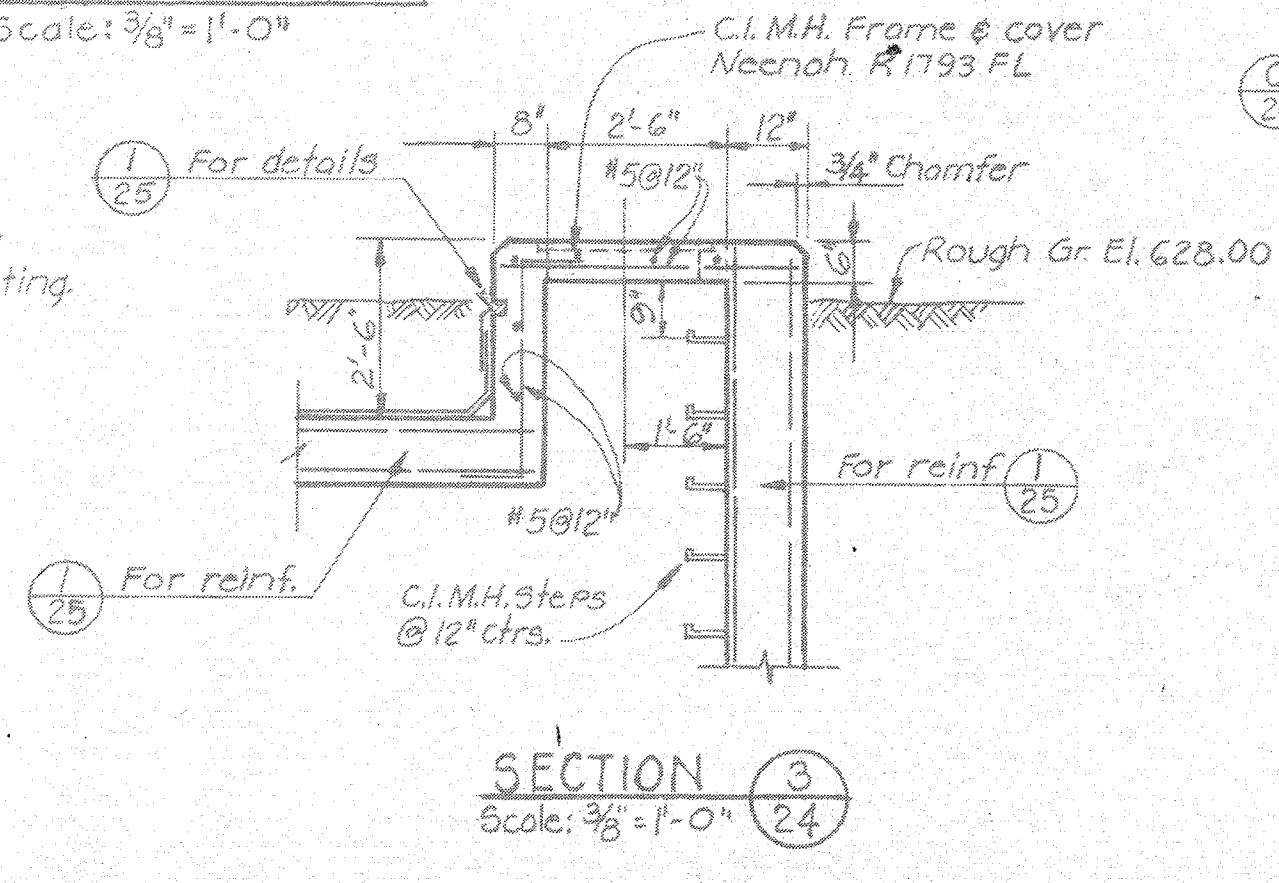


SECTION

VENT DETAIL (E)  
Scale: 3/8\"/>



WALL PIPE DETAIL (C)  
No Scale



SECTION (3)  
Scale: 3/8\"/>

Note: All reinf. #5 @ 12\"/>

GENERAL NOTE:  
SCREENED (LIGHT) DELINEATION  
ON THIS DRAWING INDICATES  
WORK TO BE DONE BY OTHERS  
UNDER CONTRACT NO. 1. JUL 15 1975

**PRELIMINARY**  
CONTRACT NO.

**DULUTH, MINNESOTA**  
**WATER WORKS IMPROVEMENTS**  
**WASH WATER RECOVERY FACILITIES**  
**CONCRETE SECTIONS & DETAILS**

BLACK & VEATCH  
CONSULTING ENGINEERS, KANSAS CITY, MO.  
DESIGNED M.P.S. CHECKED U.A.R.  
DETAILED A.E.H., J.W.P. APPROVED DATE  
SHEET 26 OF