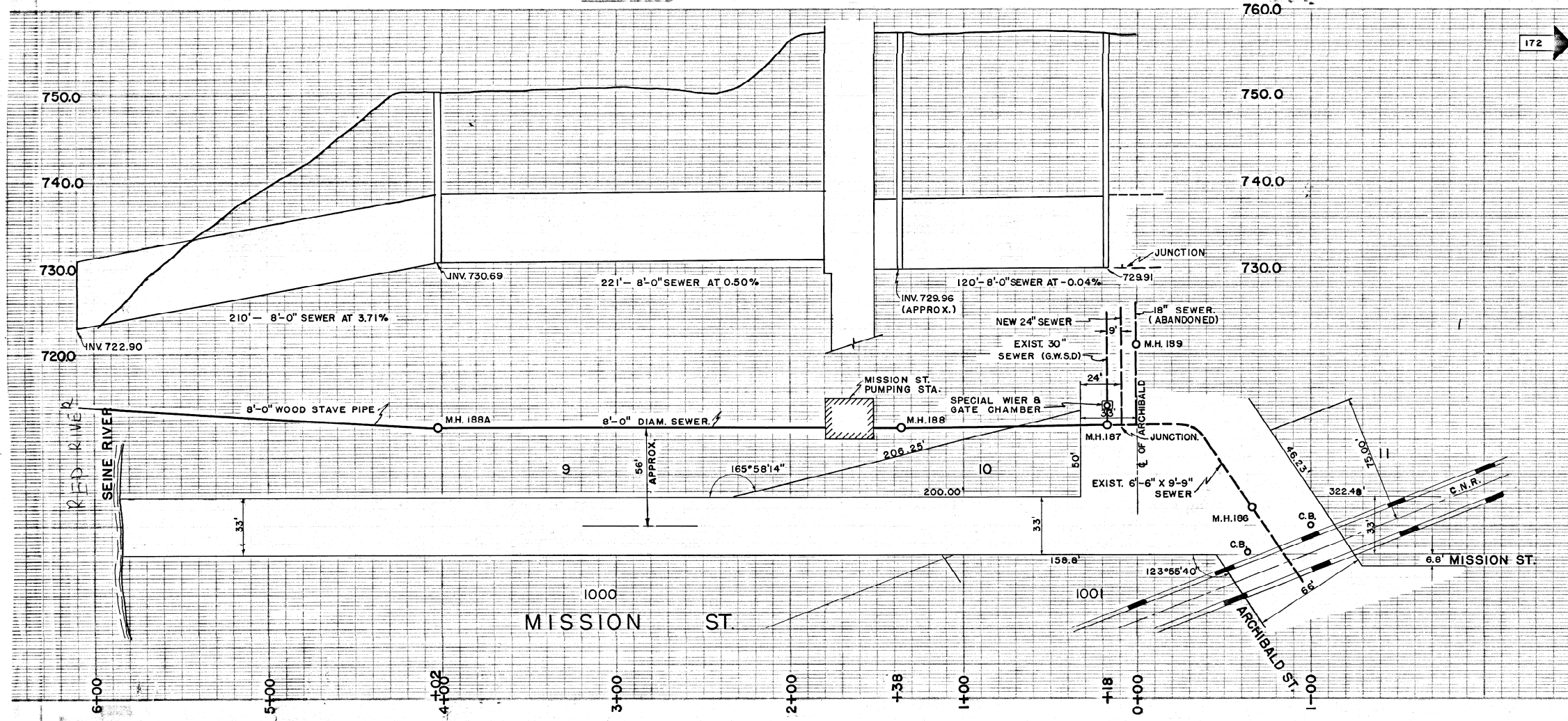


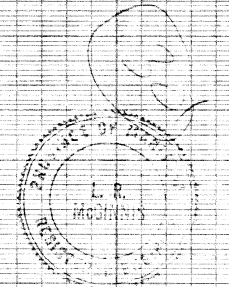
Appendix A
Record Drawings

ENGINE MEMBER OF
PROV. ENGINEERS
ASSOCIATION

SCALED TO 1/2" = 10'



172



CITY OF ST. BONIFACE
PUBLIC WORKS DEPARTMENT

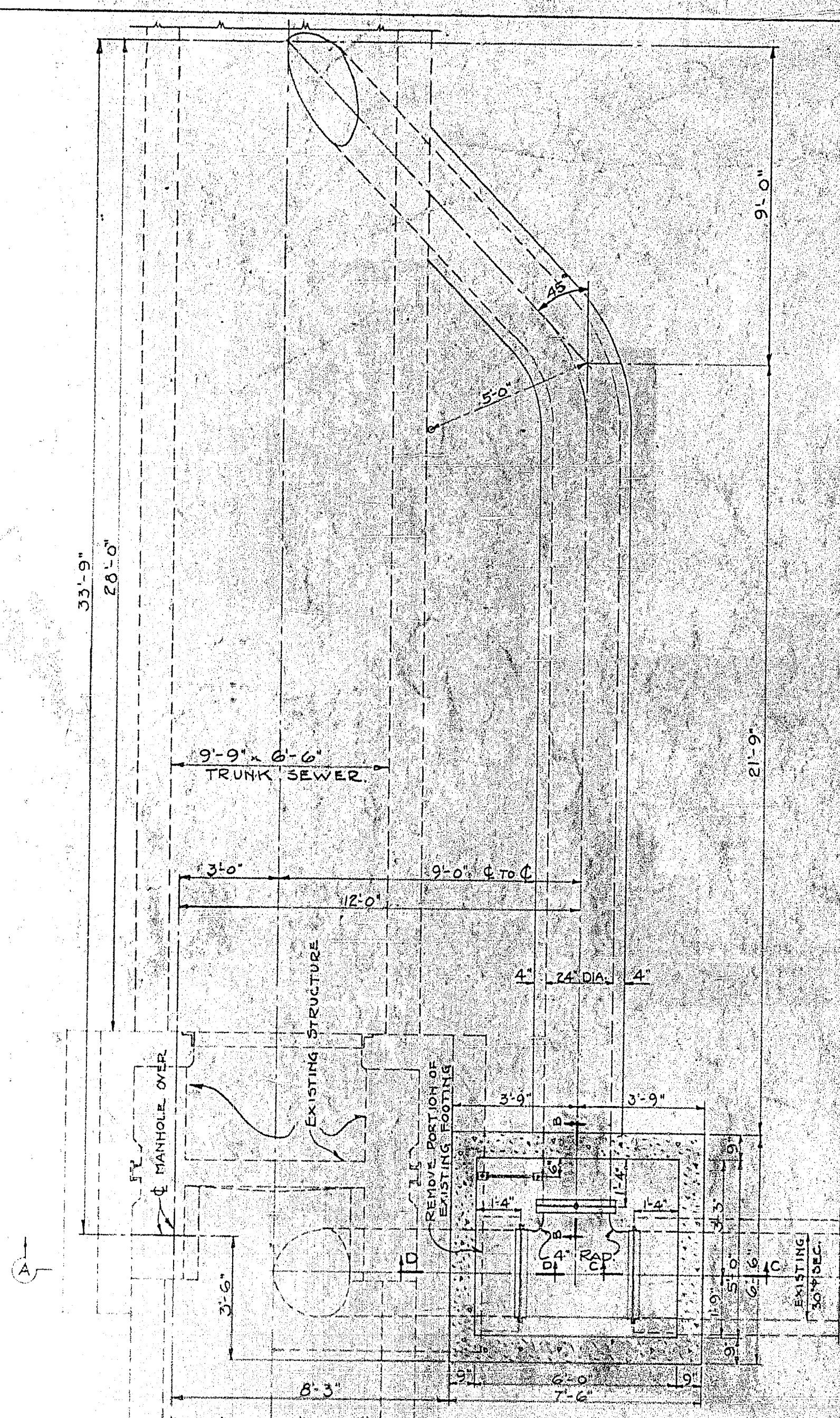
AS BUILT SERVICES
PLAN & PROFILE OF MISSION ST.
PUMPING STATION.

W. L. WARDROP & ASSOCIATES
ENGINEERING CONSULTANTS
WINNIPEG CANADA

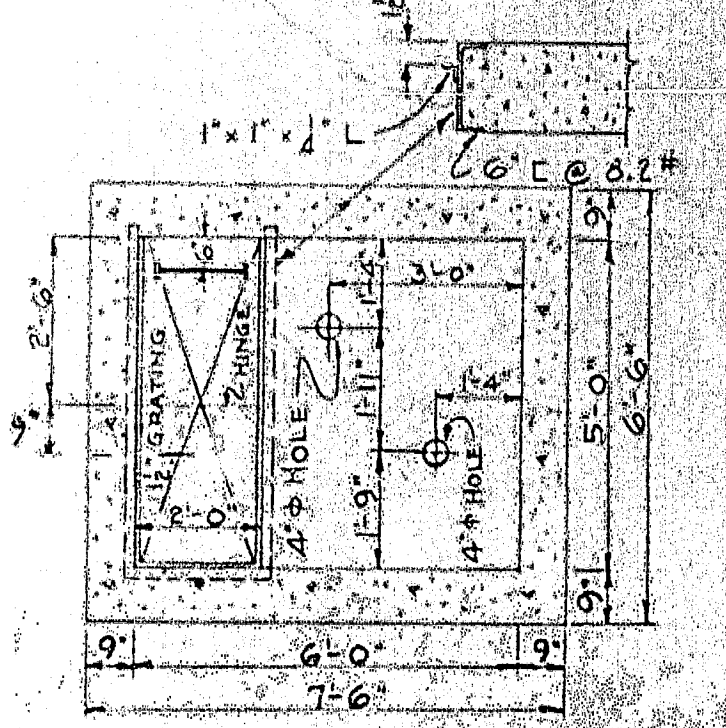
Scale: HORIZ. 1"=40' VERT. 1"=8' Date: DECEMBER 1958.

Drawn By: _____ Drawing No. _____
Checked By: *LM* _____
Project No. 5823 S-149

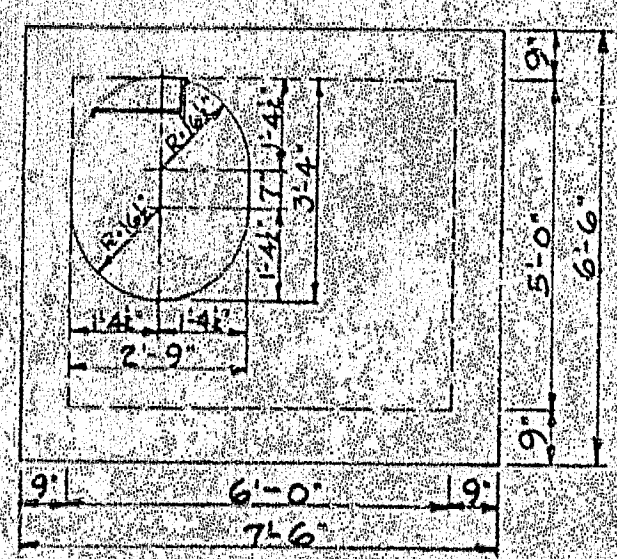
102530



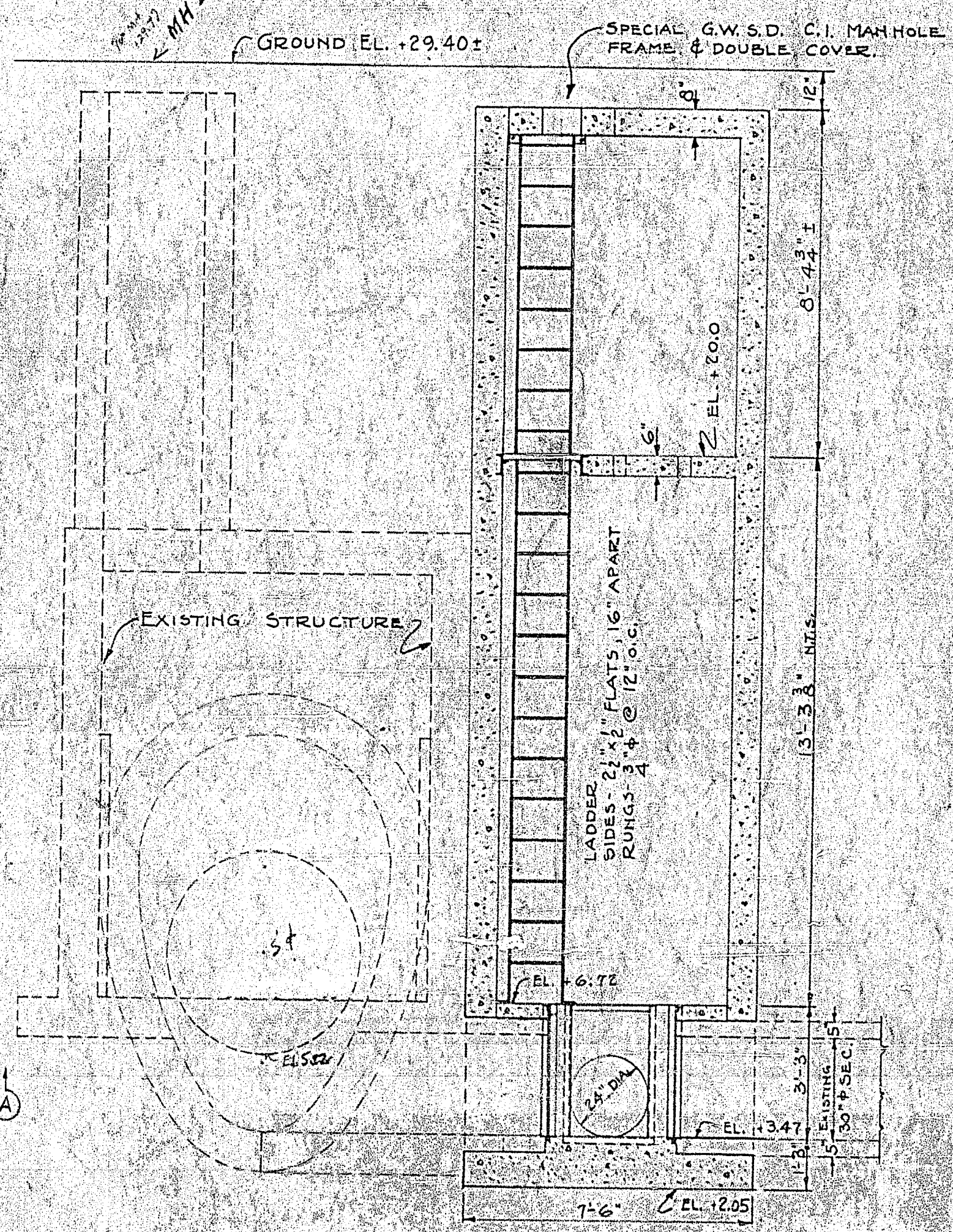
SECTIONAL PLAN ABOVE EL. +6.55 (+2.0)
SEE M. 100 (MAY 1937)



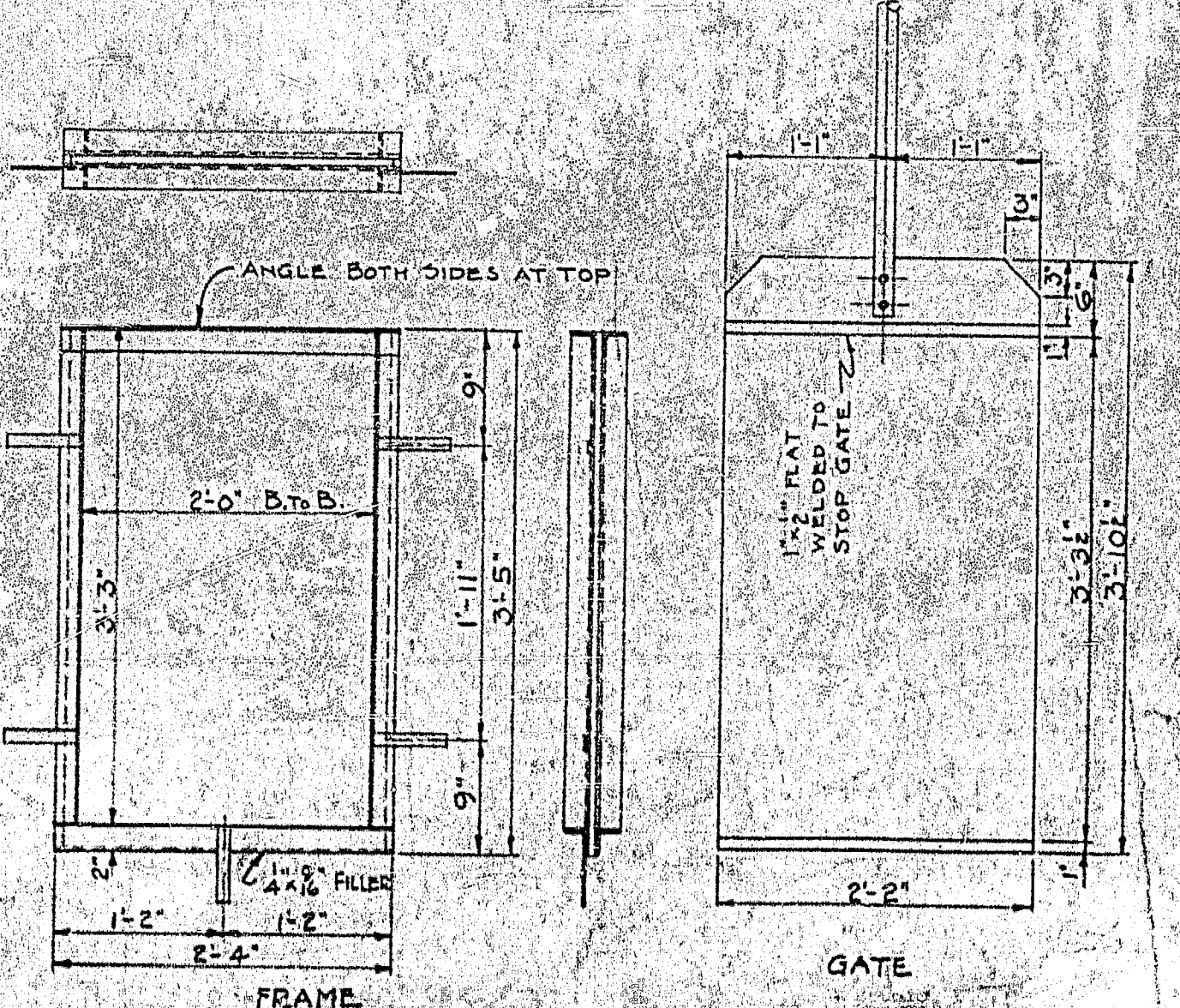
PLAN OF PLATFORM AT EL. +20.0



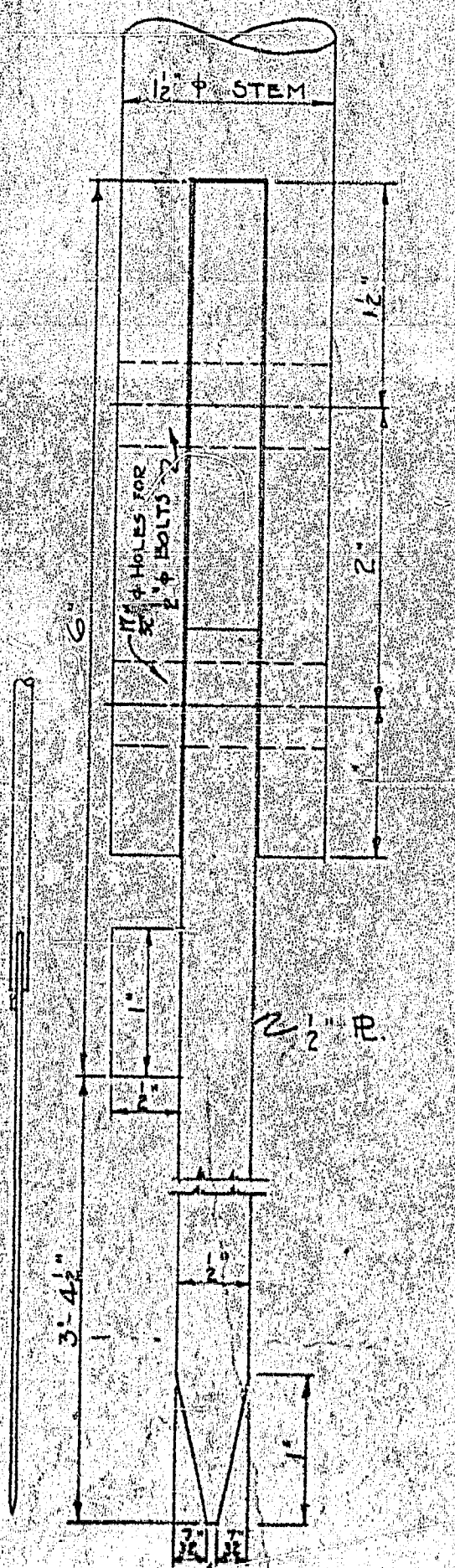
ROOF PLAN



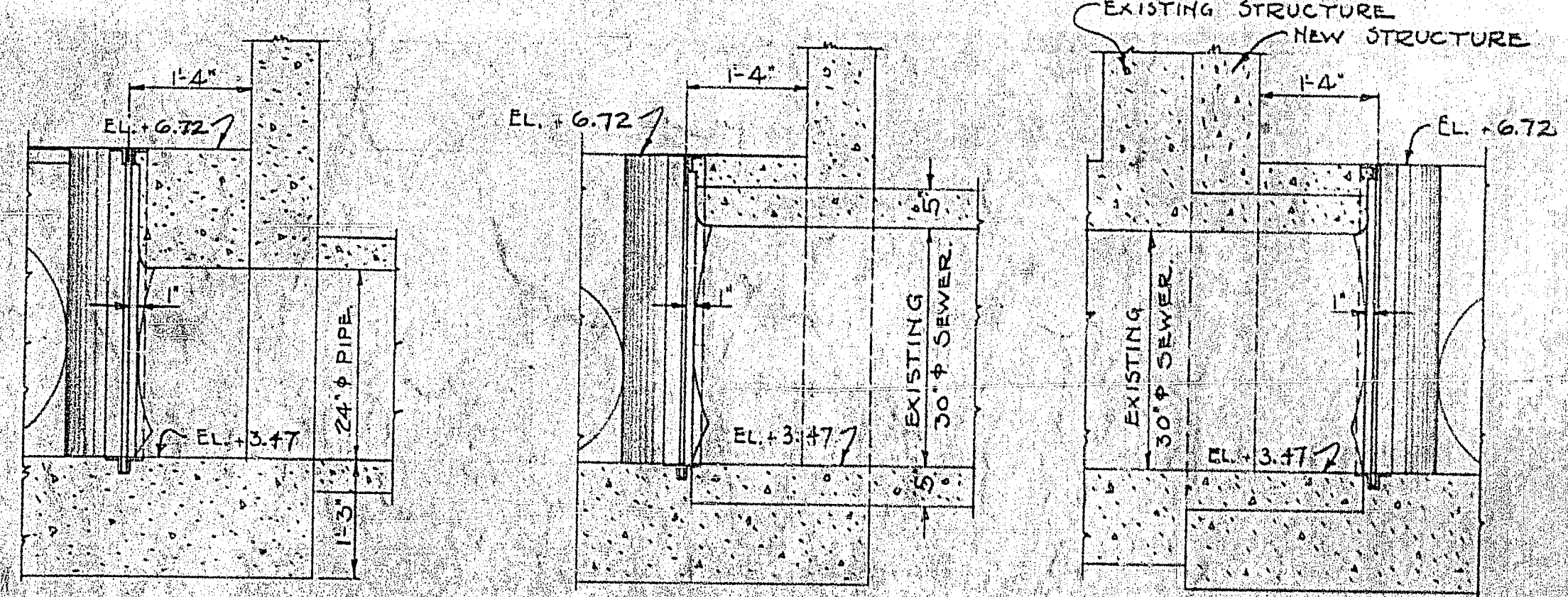
SECTION A-A



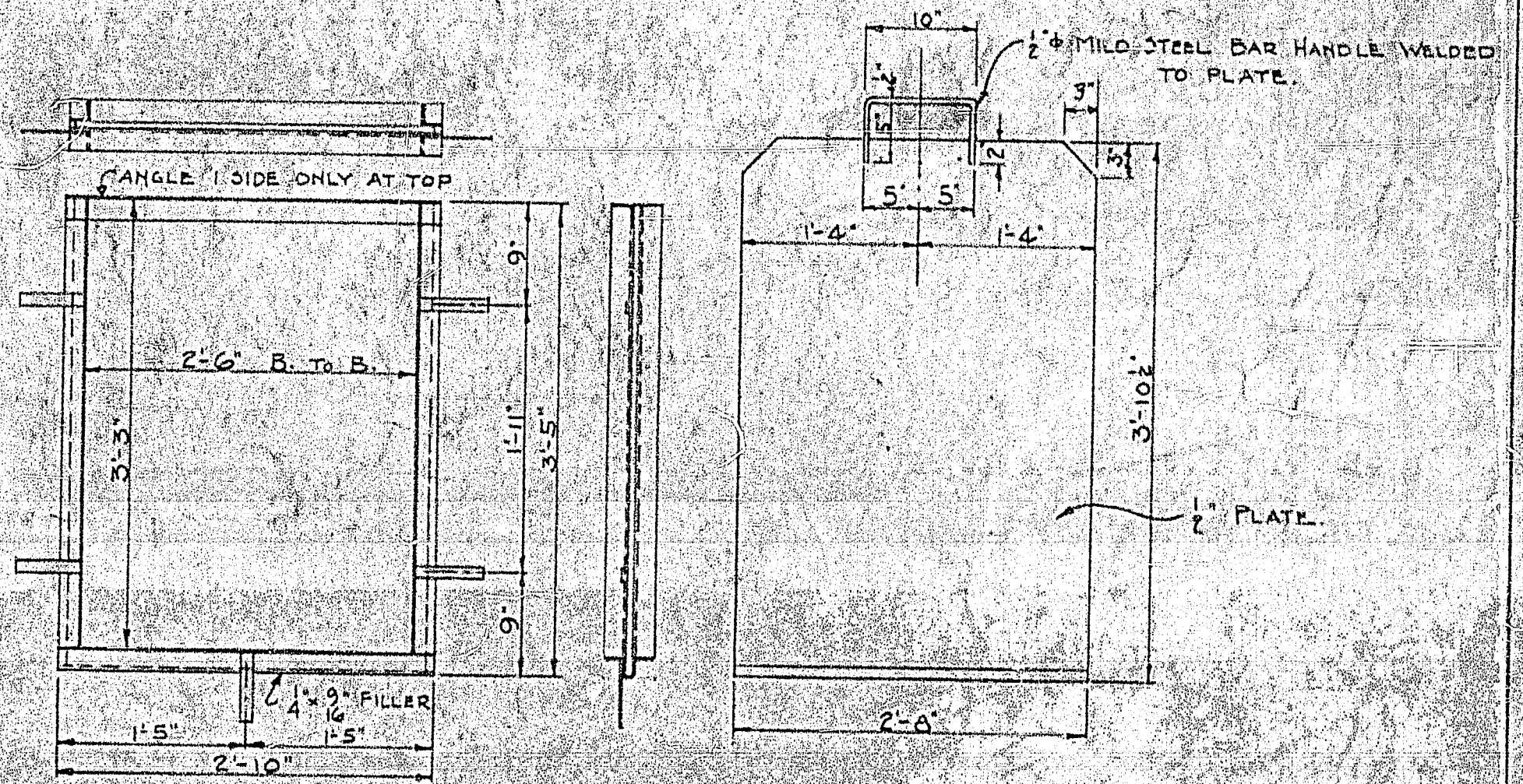
FRAME & GATE FOR 24" OUTLET
SCALE 1" = 1'-0"



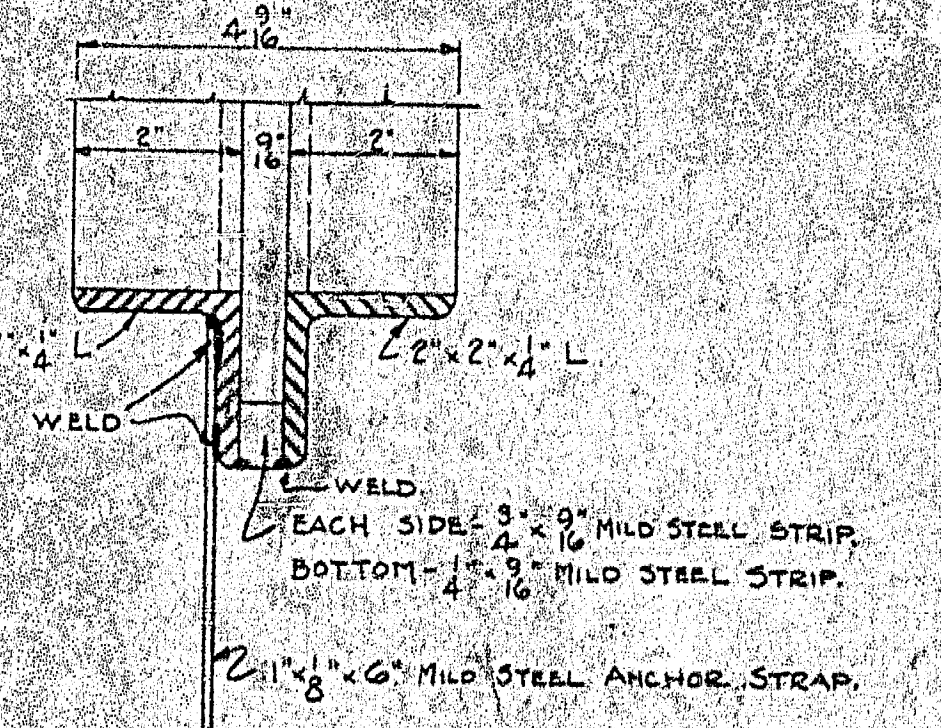
END VIEW OF GATE
SCALE - FULL SIZE



SECTIONS THROUGH STOP GATE FRAMES
SCALE 3/4" = 1'-0"

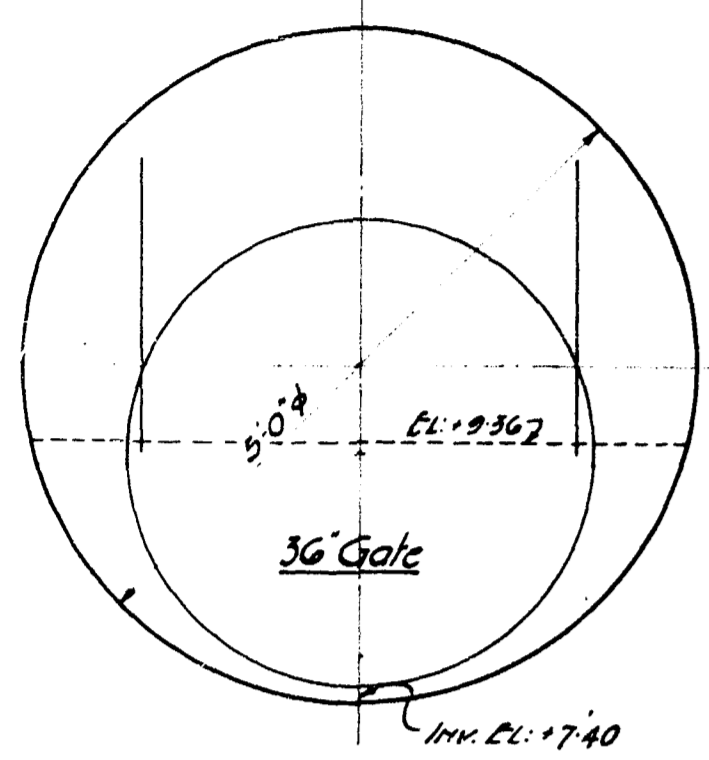


FRAME & GATE FOR 30" SECONDARY INLET & OUTLET
SCALE 1/2" = 1'-0"

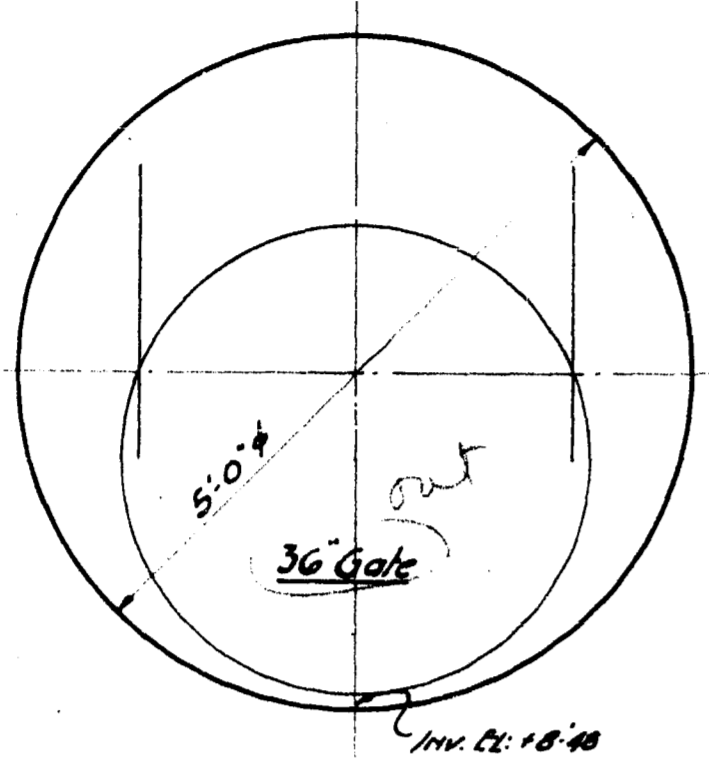


SECTION THROUGH SIDE OF FRAMES
SCALE 1/2" = 1'-0"

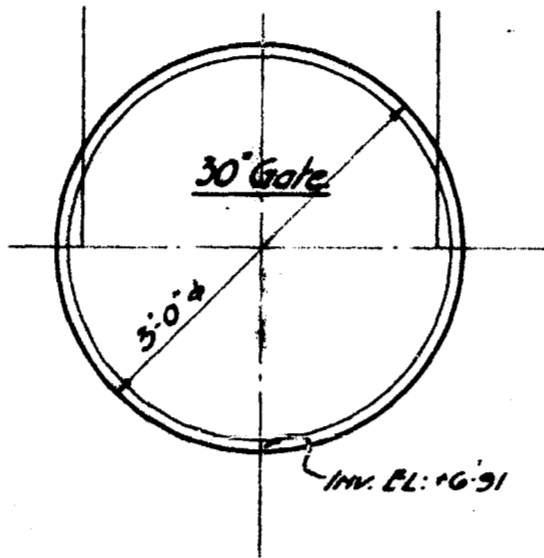
GREATER WINNIPEG SANITARY DISTRICT	
W. SILEA ENGINEER IN CHARGE	TITLE MISSION ST. BY-PASS
W. P. BRANTON, DISTRICT INSPECTOR	DATE
J. W. THOMPSON, DISTRICT SUPERVISOR	SCALE 1/2" = 1'-0" EXCEPT AS SHOWN FEB 28/39
C. B. LARSEN, DISTRICT SUPERVISOR	DRAWN BY F. S. A. PLAN NO. 219
W. D. HENNING, DISTRICT SUPERVISOR	CHECKED BY
NOTES: See M. 100 on sheet B-6-C-C for details of adjacent structure.	APPROVED BY



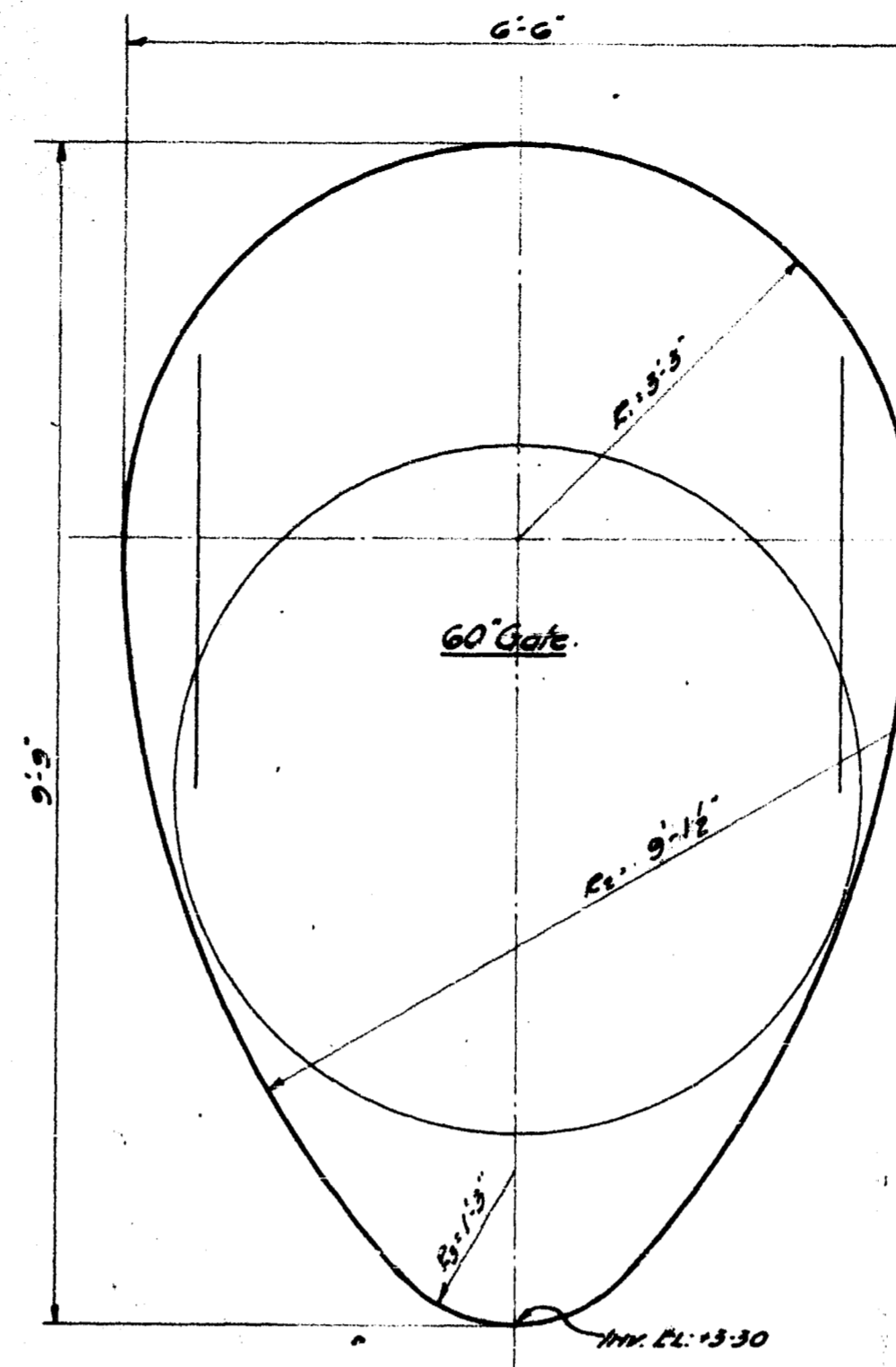
BANNATYNE AVE.
For Alteration see Dwg. No. 218



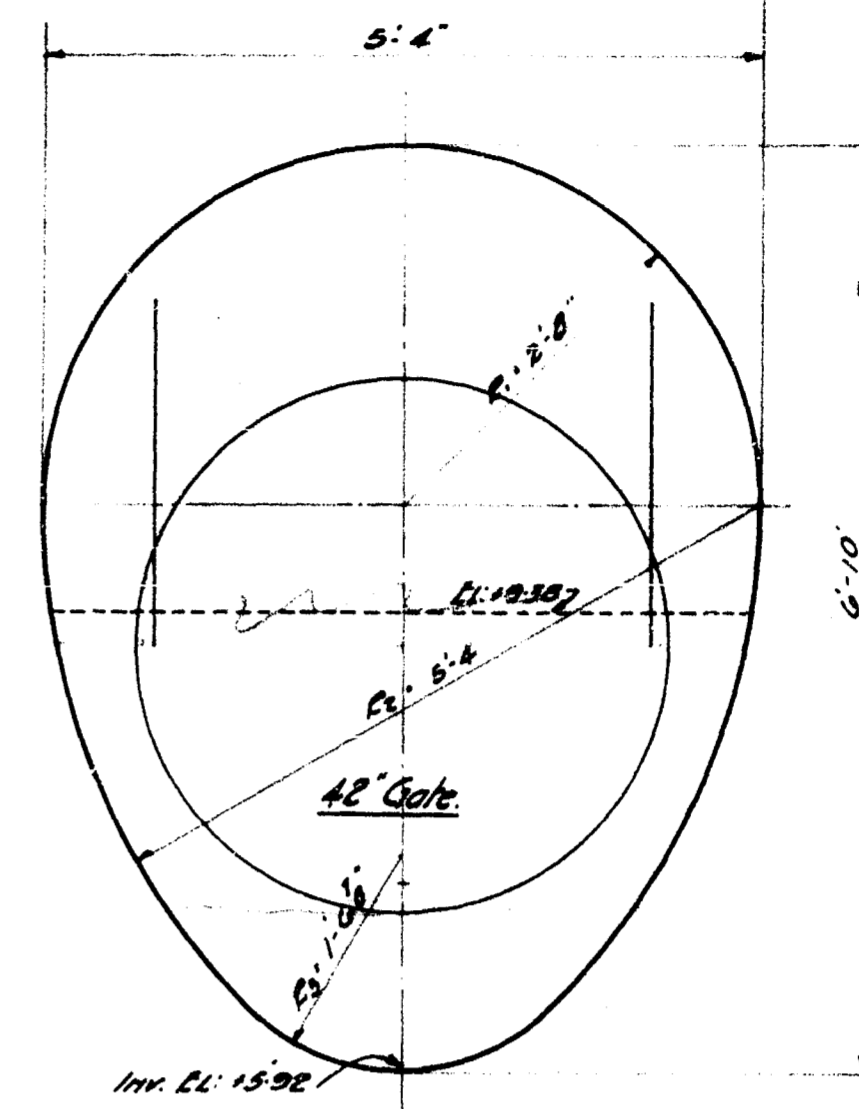
ROBERT AVE.
SPECIAL CHANGE - See Dwg. No. 200
For Alteration (1942) see Dwg. No. M106



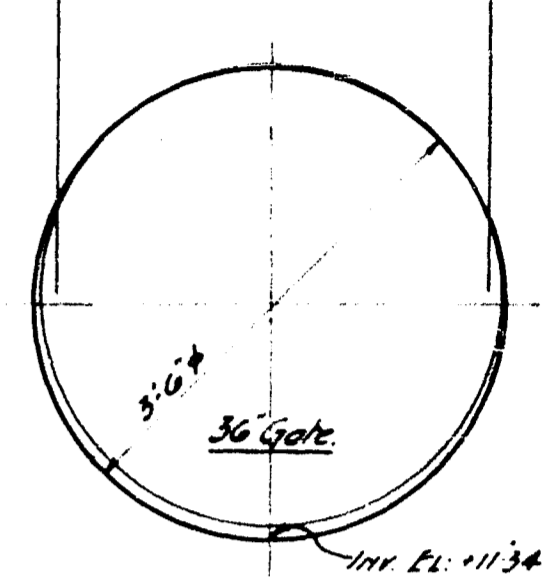
BOYLE ST.
SPECIAL CHANGE - See Dwg. No. 200
For Alteration (1942) see Dwg. No. M106



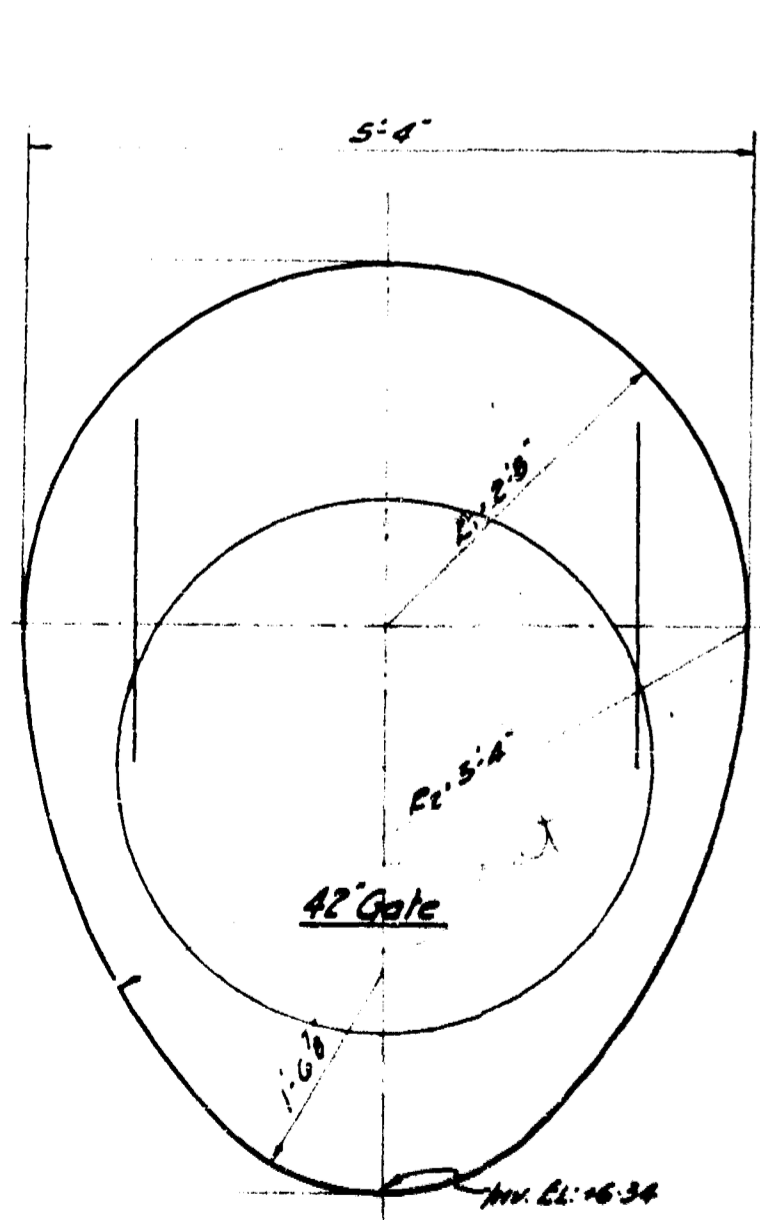
MISSION ST.
SPECIAL CHANGE - See Dwg. No. 200



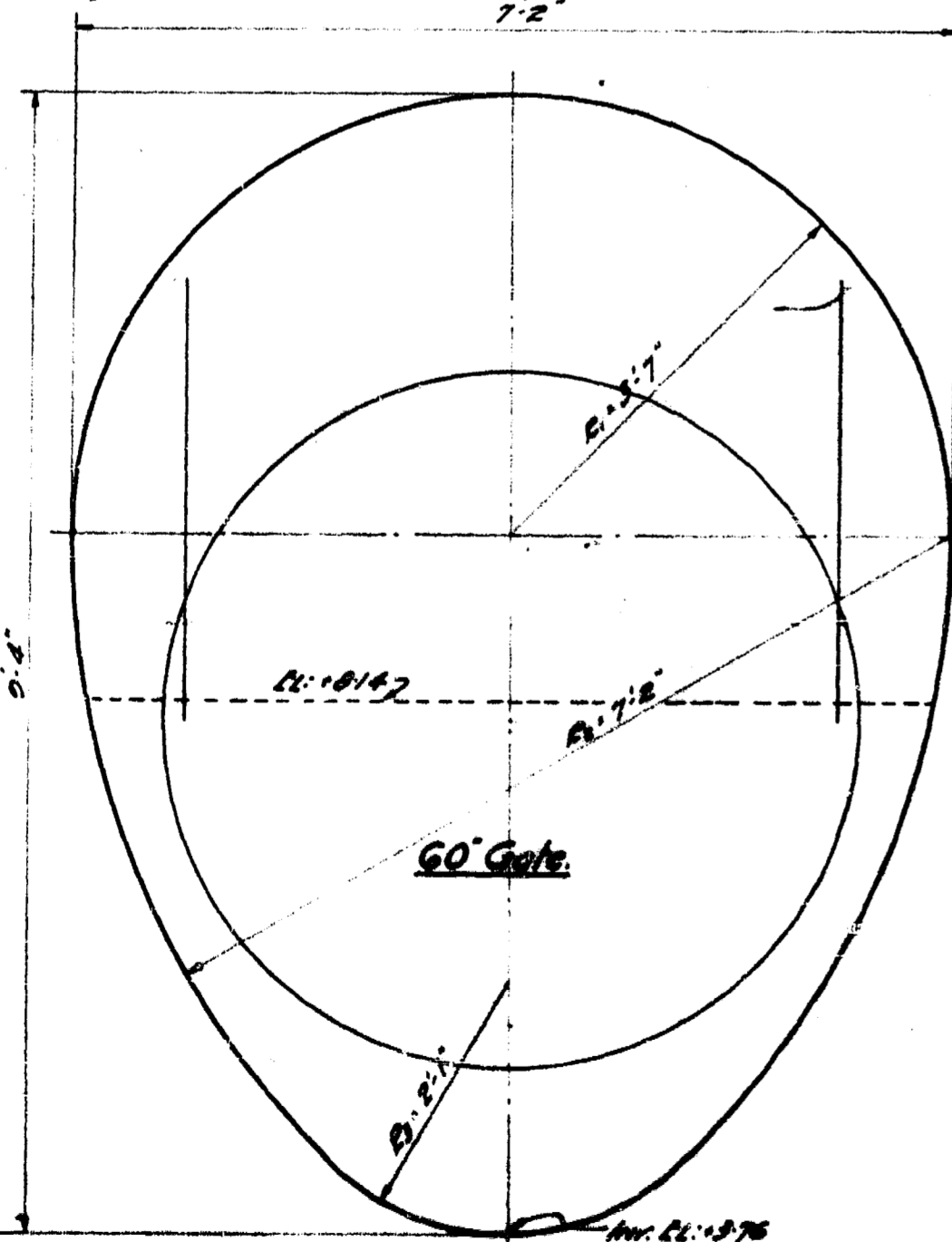
ORLEANS AVE.
Altered 1942 - see Drawing No. M106



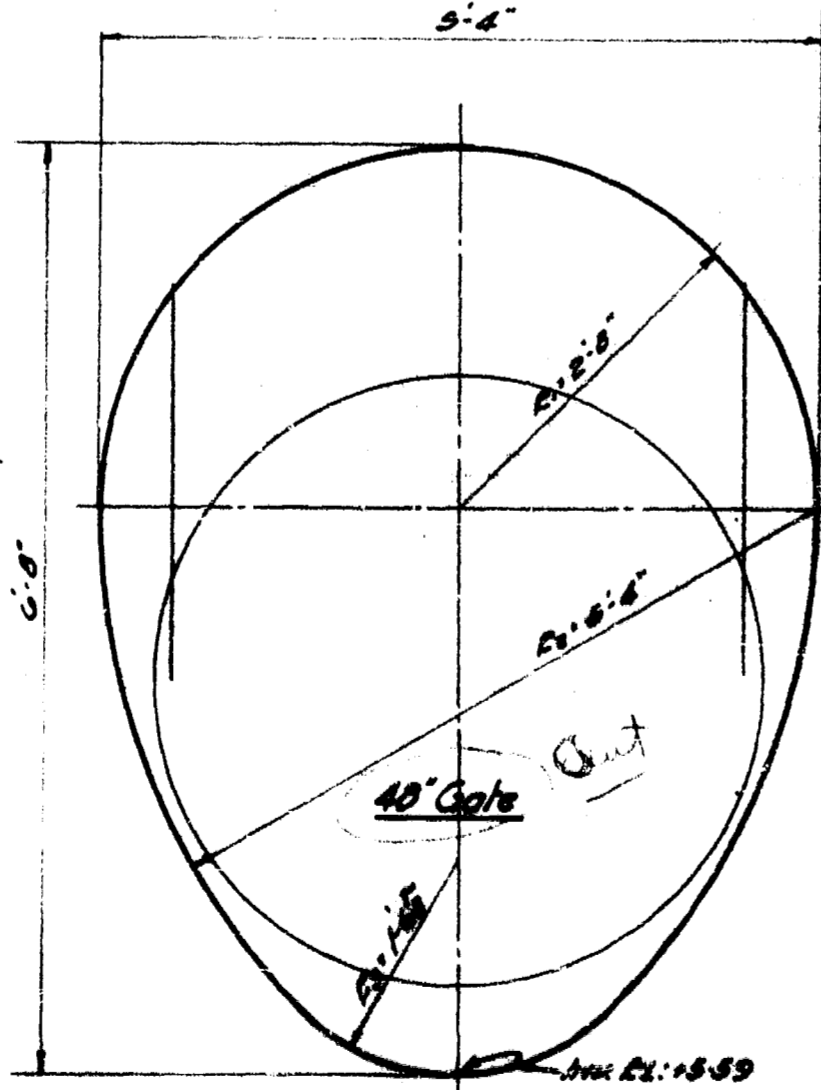
SYNDICATE ST.
SPECIAL CHANGE - See Dwg. No. 200
For Alteration (1942) see Dwg. No. M106



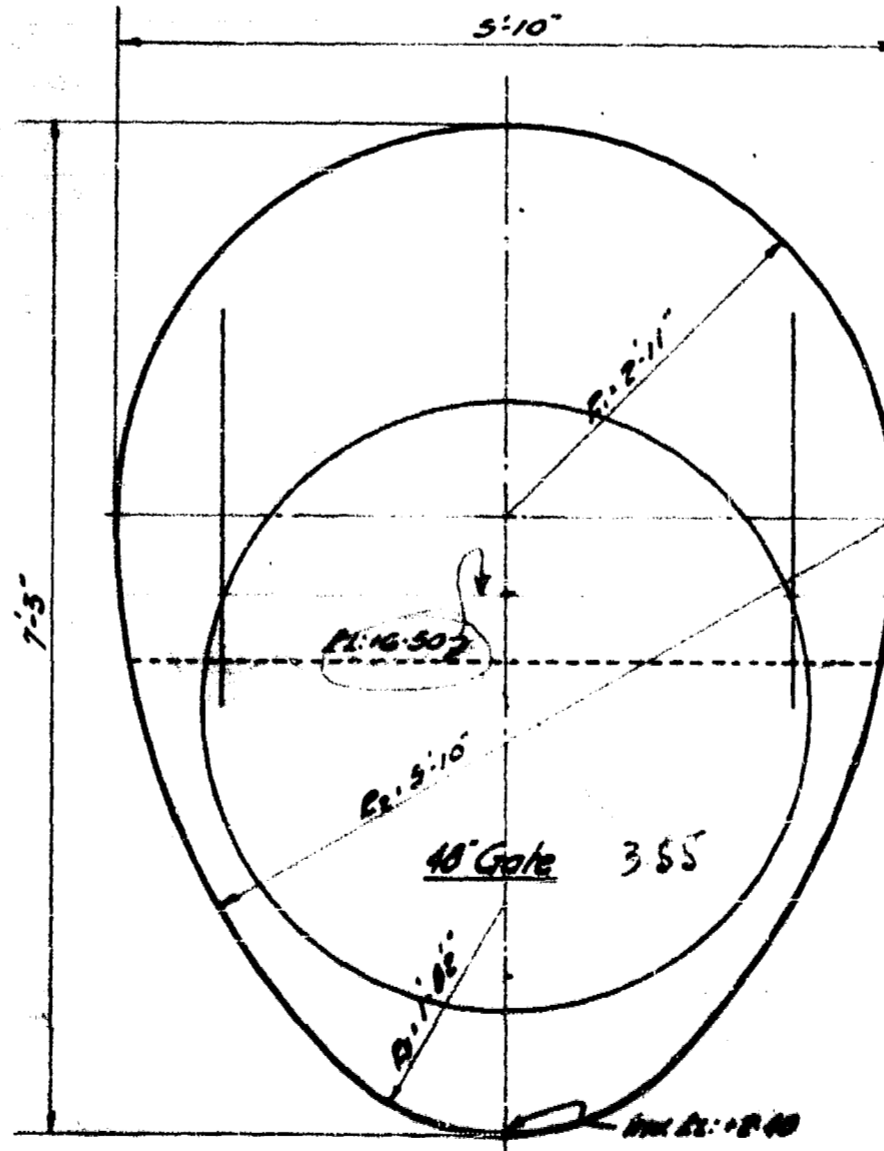
SELKIRK AVE.
SPECIAL CHANGE - See Dwg. No. 200
For Alteration (1942) see Dwg. No. M106



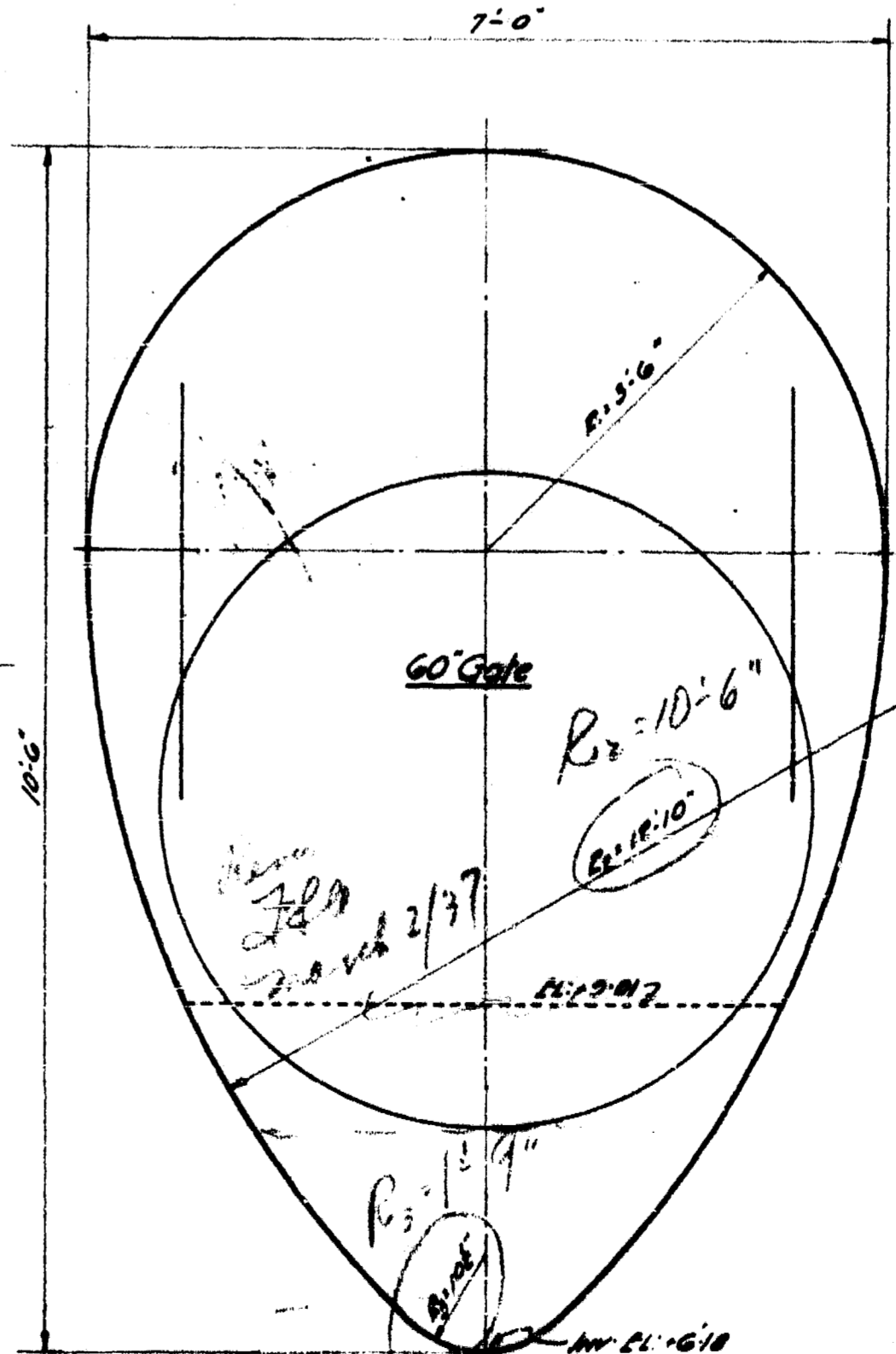
HART AVE.
ALTERED 1942 see Dwg. No. M106



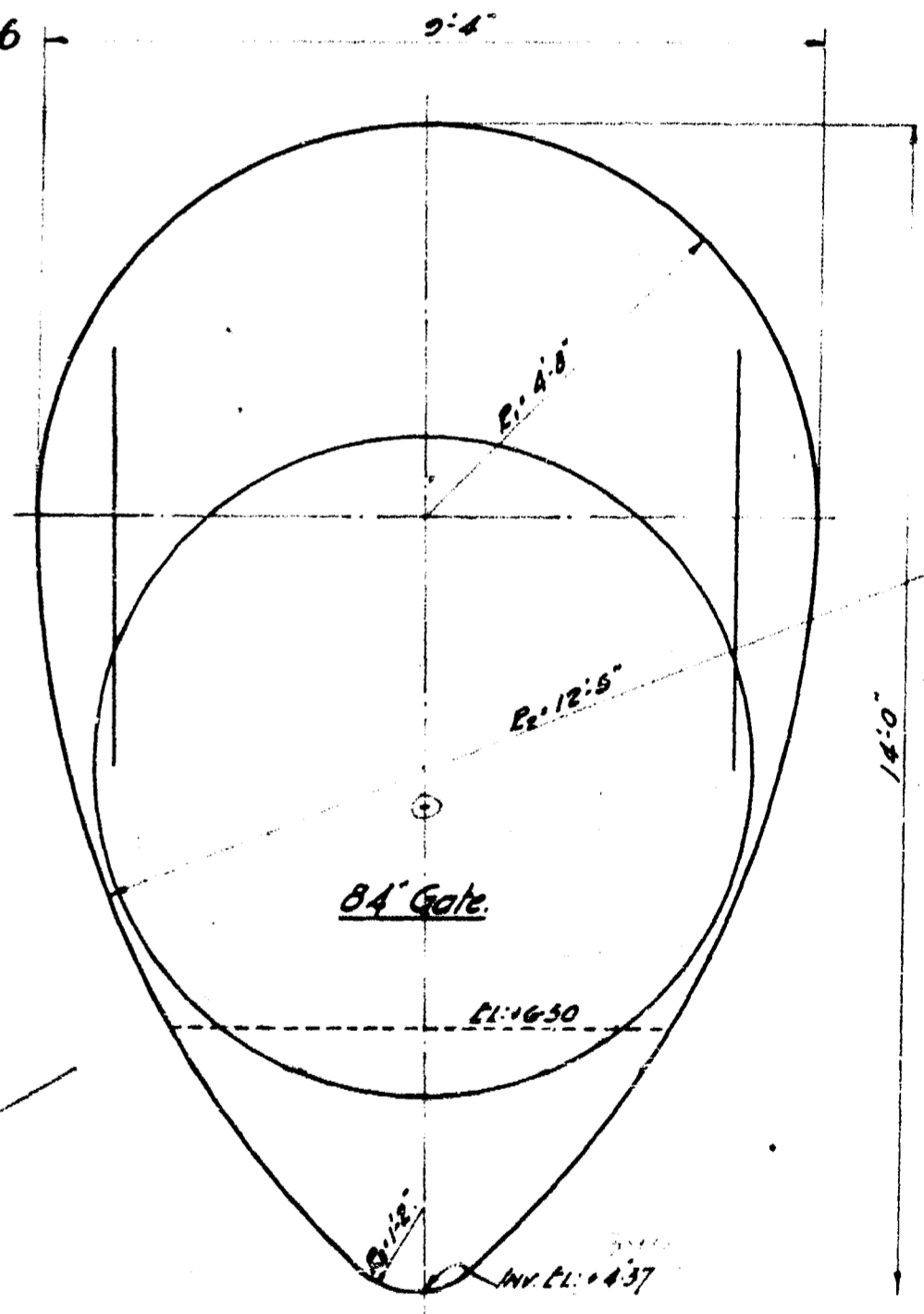
ST. JAMES AVE.
SPECIAL CHANGE - See Dwg. No. 200
For Alteration (1942) see Dwg. No. M106



POLSON AVE.
FOR ALTERATION (1942) SEE DWG. NO. M107

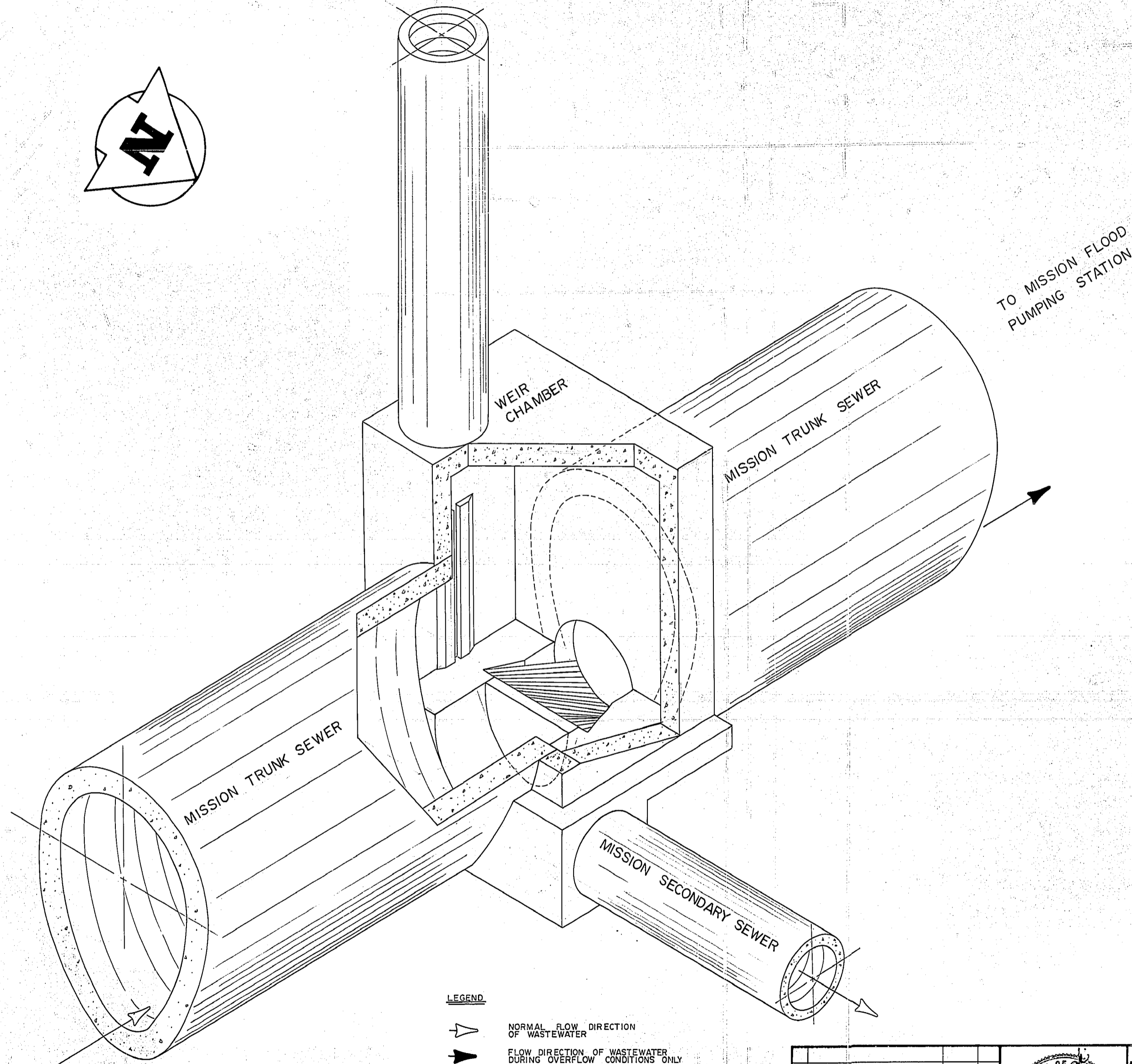
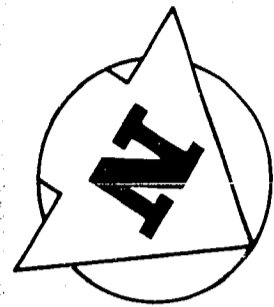


MURRAY AVE.
FOR ALTERATION (1942) SEE DWG. NO. M106.



JEFFERSON AVE.
Scale: 1/4" = 1'-0"
APPROVED

DATE: _____
SCALE: 1/4" = 1'-0"
APPROVED: _____
ALTERATION NOTES ADDED: _____
189

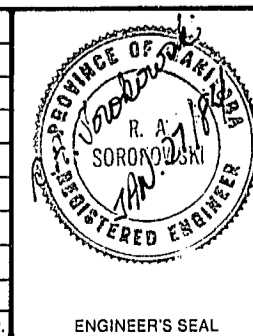


LEGEND

- NORMAL FLOW DIRECTION OF WASTEWATER
- FLOW DIRECTION OF WASTEWATER DURING OVERFLOW CONDITIONS ONLY

FOR INFORMATION ONLY

NO.	REVISIONS	DATE	APP.



W		WORKS & OPERATIONS DIVISION	
		WATERWORKS, WASTE & DISPOSAL DEPARTMENT	
DESIGNED BY: R. FALK	DRAWN BY: R. FALK	CHECKED BY: R. A. S.	DATE: JAN. 27 / 1984
APPROVED BY: <i>R. M. Sibley</i>	DATE: Jan. 27/84		

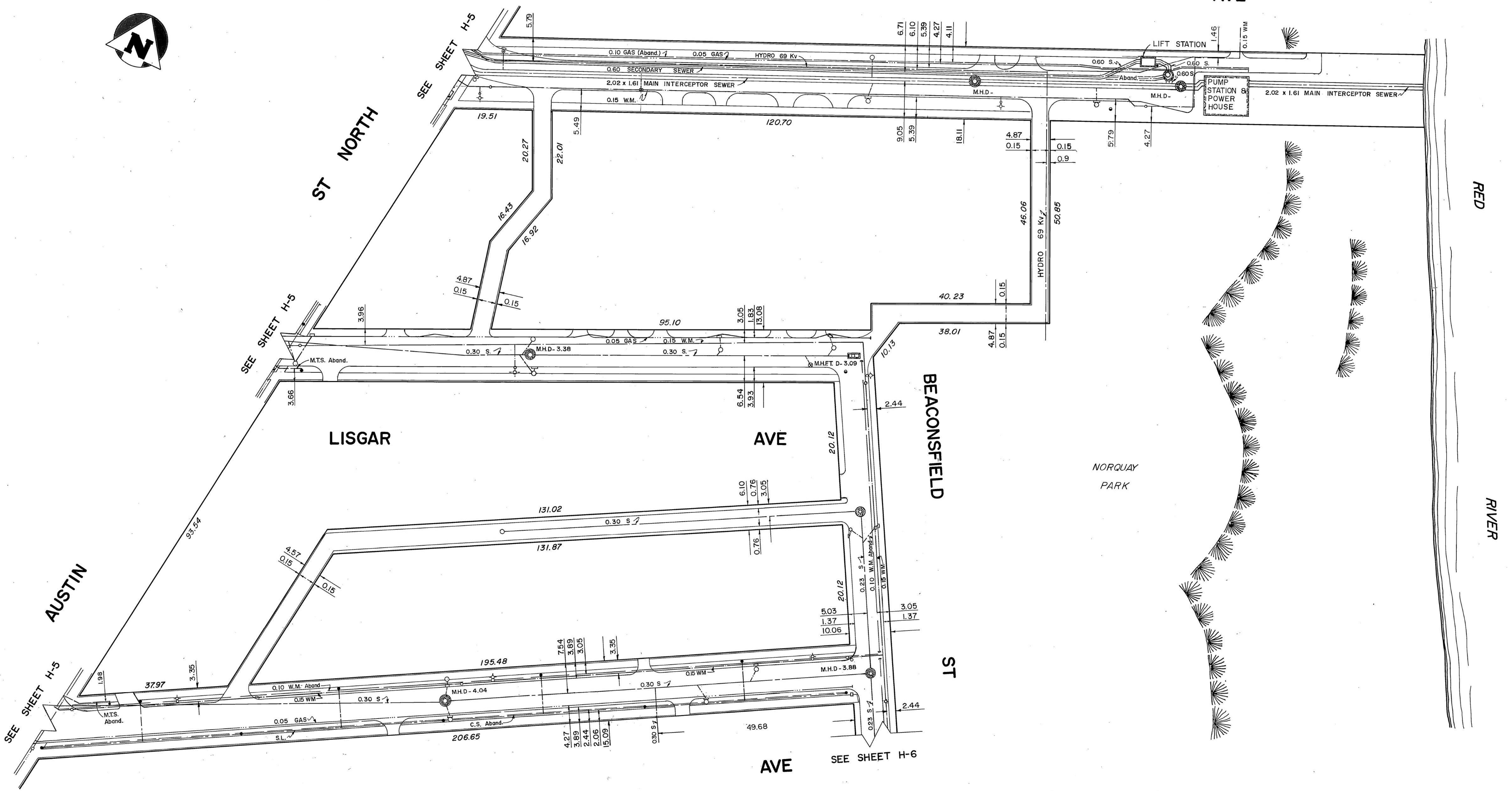
THE CITY OF WINNIPEG
WORKS & OPERATIONS DIVISION
WATERWORKS, WASTE & DISPOSAL DEPARTMENT

MISSION SECONDARY SEWER UPGRADING	
ISOMETRIC OF WEIR CHAMBER	
RELEASED FOR CONSTRUCTION: <i>R. M. Sibley</i>	DATE: Jan. 27/84
SCALE: N.T.S. (APPROX. 3/8" = 1'-0")	DRAWING NO.: 1124



SELKIRK

AVE



LOCATIONS OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATION ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

METRIC

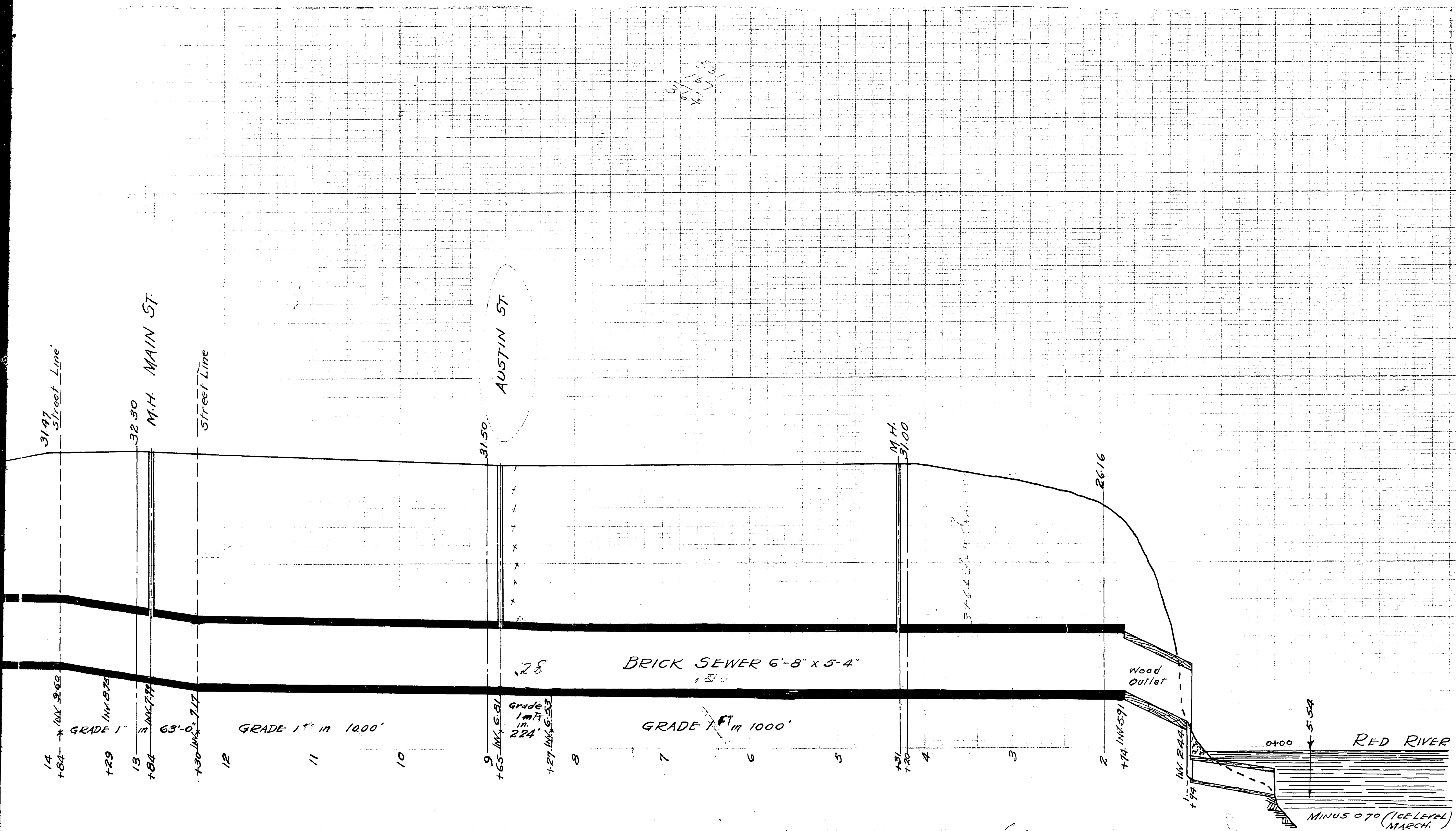
8			
7			
6			
5			
4	92-11-23	N.S	D J H
3	88-11-08	R.D.	
2			

MANHOLE DEPTH	M.H.D.
HYDRANT	+
WATER VALVE	o
SERVICE BOX	□
CATCH BASIN	○
STREET LIGHTING POLE	●
SURVEY BAR	•

MANITOBA TELEPHONE SYSTEM	(M.T.S.)	_____
CITY SIGNALS	(C.S.)	_____
SEWER, STORM RELIEF SEWER	(S.), S.R.S.	_____
WATERMANS	(W.M.)	_____
GAS		_____
C.P.R. TELEGRAPHS		_____
C.M.T. TELEGRAPHIC		_____

CITY of WINNIPEG
BLOCK BOUNDED BY

UNDERGROUND STRUCTURES COMMITTEE



6/10/1931
W.J.H.
V.C.

REVISED DRAWING

TRUNK SEWER
SELKIRK AVE.
CHARLES ST. TO RED RIVER
Nov 12th 1931

W.J.H.
DUPPLICATE OF ORIGINAL
ORIGINAL SCRAPED OWING
TO PORTION MISSING.

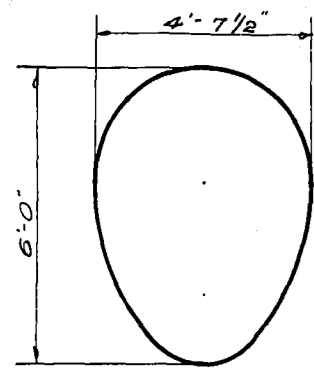
4022
5-188

305

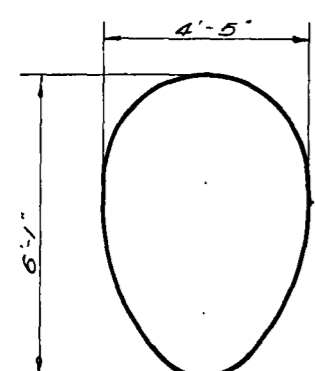
63
03
51
07

2.17

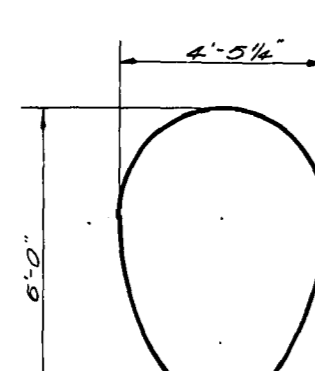
1000
20



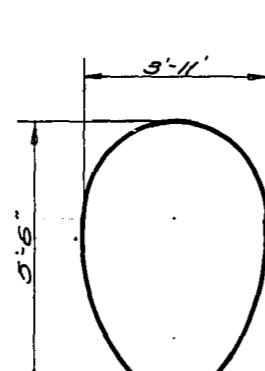
St. Johns Av. - 1st M.H. East of Atkins St.
Type - Winnipeg
Area - 21.0 Sq. Ft.
Wet. Per. - 17.0
Hyd. Rad. - 1.24



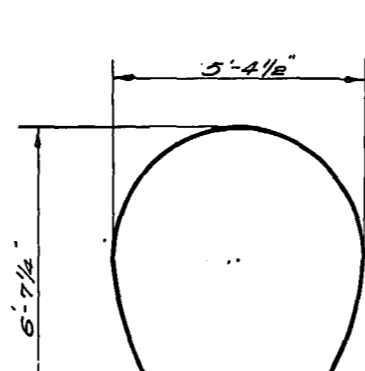
St. Johns Av. St. Johns Av. at Salter St.
Type - Winnipeg
Area - 21.2 Sq. Ft.
Wet. Per. - 17.2
Hyd. Rad. - 1.23



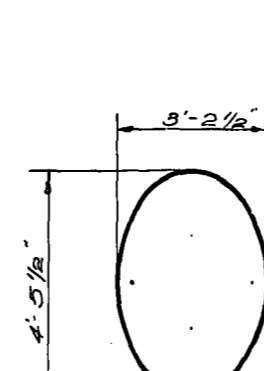
Selkirk Av. - 1st M.H. East of Salter St. (E.S.)
Type - Winnipeg
Area - 20.4 Sq. Ft.
Wet. Per. - 16.7
Hyd. Rad. - 1.22



Selkirk Av. - 1st M.H. East of Salter St. (W.S.)
Type - Winnipeg
Area - 15.97 Sq. Ft.
Wet. Per. - 15.0
Hyd. Rad. - 1.07



Selkirk Av. Selkirk Av. at Austin St.
Type - Winnipeg
Area - 27.6 Sq. Ft.
Wet. Per. - 19.0
Hyd. Rad. - 1.45



Clifton St. - 1st M.H. North of Richard Av.
Type - Elliptical
Area - 11.5 Sq. Ft.
Wet. Per. - 12.3
Hyd. Rad. - 0.92

TYPE	EQUAL CONC. CIRCLE THICK.	TYPE	EQUAL CONC. CIRCLE THICK.
I	2'-0" Circular	IX	8'-10" x 6'-10"
II	2'-6" "	X	9'-0" x 6'-8"
III	3'-0" "	XI	7'-5" x 5'-9"
IV	3'-0" "	XII	7'-8" x 6'-0"
V	3'-1" x 6'-3"	XIII	8'-5" x 6'-6"
VI	3'-0" x 4'-5"	XIV	8'-7" x 6'-7"
VII	3'-2" x 4'-0"	XV	6'-8" x 5'-2"
VIII	3'-4" x 7'-2 1/2"	XVI	6'-9" x 5'-3"
	9'-6" x 7'-4"	XVII	4'-0" x 3'-7"
	10'-0" x 7'-6"	XVIII	7'-1" x 5'-5"
	10'-1" x 7'-8"	XIX	6'-3" x 4'-10"
	10'-4" x 8'-0"	XX	4'-0" x 3'-6"
	11'-0" x 8'-3"		
	11'-6" x 8'-9"		
	12'-0" x 9'-2"		
	12'-7" x 9'-6"		
	13'-3" x 10'-2"		

STANDARD SEWER FORMS USED PRIOR TO 1914.

Design for Winnipeg Sewers based on formula by Hawksley (London, Eng. 1852-1856) taking into account the diameter, rainfall, surface slope, drainage area, storm water discharge when rate of rainfall with 50% runoff. Formula derived from actual flows by Roe (London 1850)

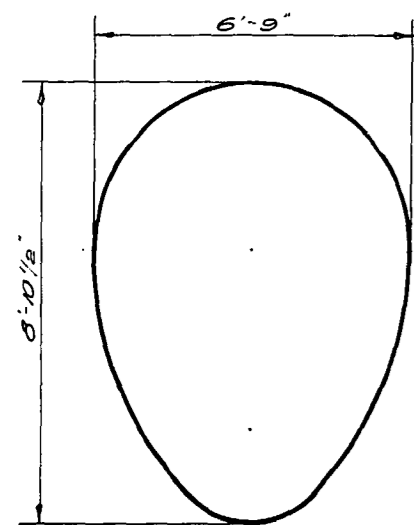
The original form of Hawksley's formula $log d = \frac{2.303 A \sqrt{S} + 0.8}{1.483 S}$ was modified to $Q = 3946 A \sqrt{S}^2$ in which Q = cfs, A = acres drained, N = length in which sewer falls 1', S = sine of slope, n = rainfall rate reaching the sewer = actual rainfall x some constant.

Later, Adams (Brooklyn N.Y. 1880) revised the Hawksley formula to make it consistent with experience in large areas. In this $\frac{1}{2}$ of rainfall reaches the sewers. Adams formula is $D = \frac{1.483 A \sqrt{S}}{1.483 S}$ or in log form $log D = \frac{2.303 A \sqrt{S} + 0.8}{1.483 S}$ where D = sewer diameter in feet, A = acres drained, N = length in which sewer falls 1', C = $\frac{1}{2}$ is taken care of in formula, S = sine of slope.

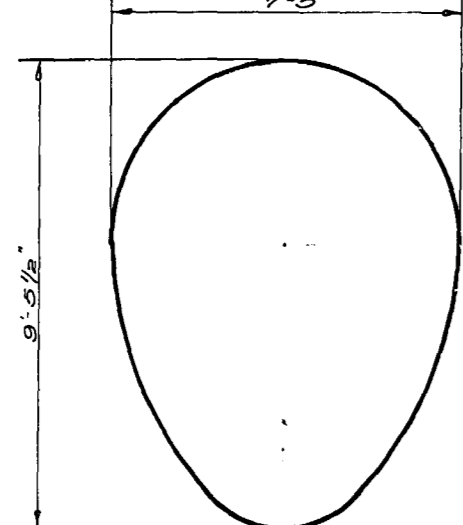
This formula $D = \frac{1.483 A \sqrt{S}}{1.483 S}$ was used in Winnipeg by Cheesborough in 1883, Ruffan 1885-1914, Aldridge 1900-1944. Sanitary flow was not considered. About 1911 the rational system of design was adopted.

The intensity of precipitation used was Aldridge $i = \frac{2.3}{L}$ where L = time in minutes, i = rate inches per hour. In 1939 $i = \frac{2.3}{L}$ (Hurst) was adopted & in 1943 $i = \frac{2.3}{L}$ (Hawson)

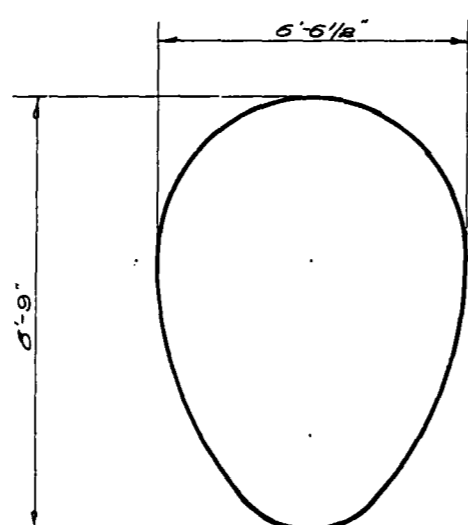
In 1946 an Drawing 3697 areas were designated where $i = \frac{2.3}{L}$ and $i = \frac{2.3}{L}$ should be used, due to economic conditions.



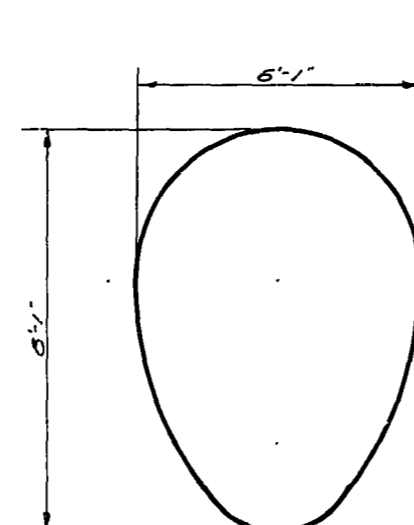
Telehurst St. 1st M.H. South of Portage Av.
Type - Winnipeg
Area - 44.7 Sq. Ft.
Wet. Per. - 24.0
Hyd. Rad. - 1.8



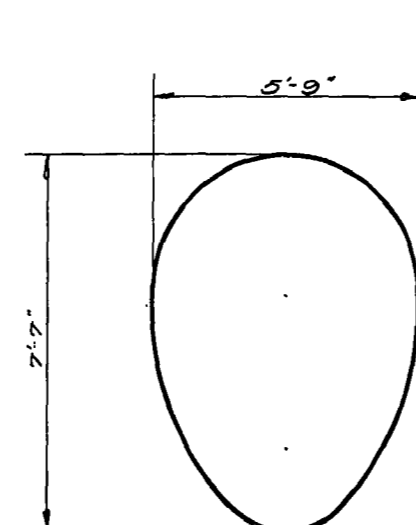
Clifton St. - 1st M.H. South of Portage Av.
Type - Winnipeg
Area - 54.7 Sq. Ft.
Wet. Per. - 26.3
Hyd. Rad. - 2.04



Clifton St. Clifton St. at Barrett Av.
Type - Winnipeg
Area - 44.7 Sq. Ft.
Wet. Per. - 24.3
Hyd. Rad. - 1.84



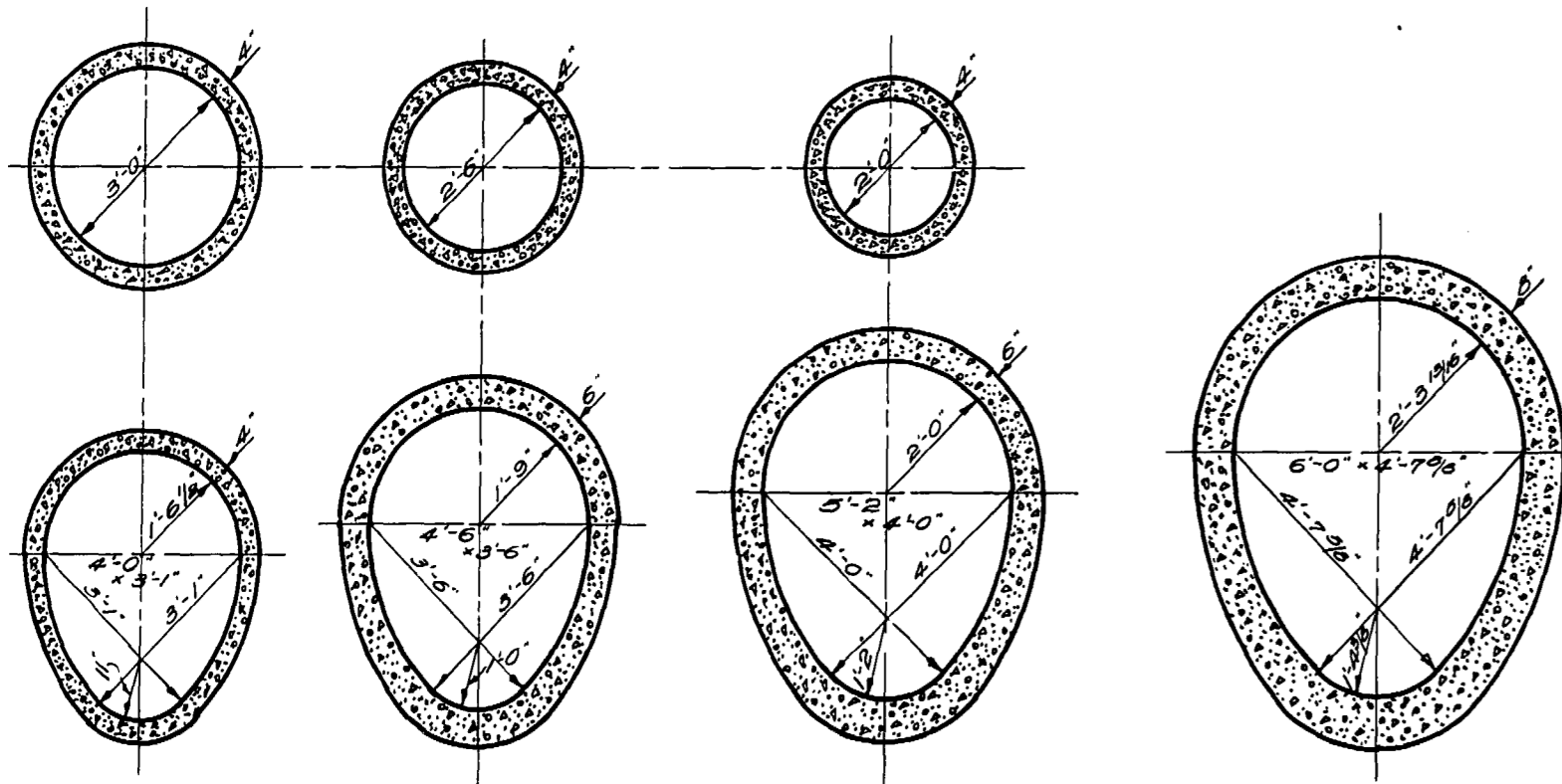
Clifton St. - M.H. at 2nd Lane north of Ellice Av.
Type - Winnipeg
Area - 39.0 Sq. Ft.
Wet. Per. - 22.6
Hyd. Rad. - 1.72



Clifton St. Clifton St. at Wellington Av.
Type - Winnipeg
Area - 33.0 Sq. Ft.
Wet. Per. - 21.5
Hyd. Rad. - 1.62

SECTIONS OF EGG SHAPED SEWERS. Scale - 3/8" = 1'-0"

Sections measured Jan. 1952. Areas by planimeter, perimeter by scaling

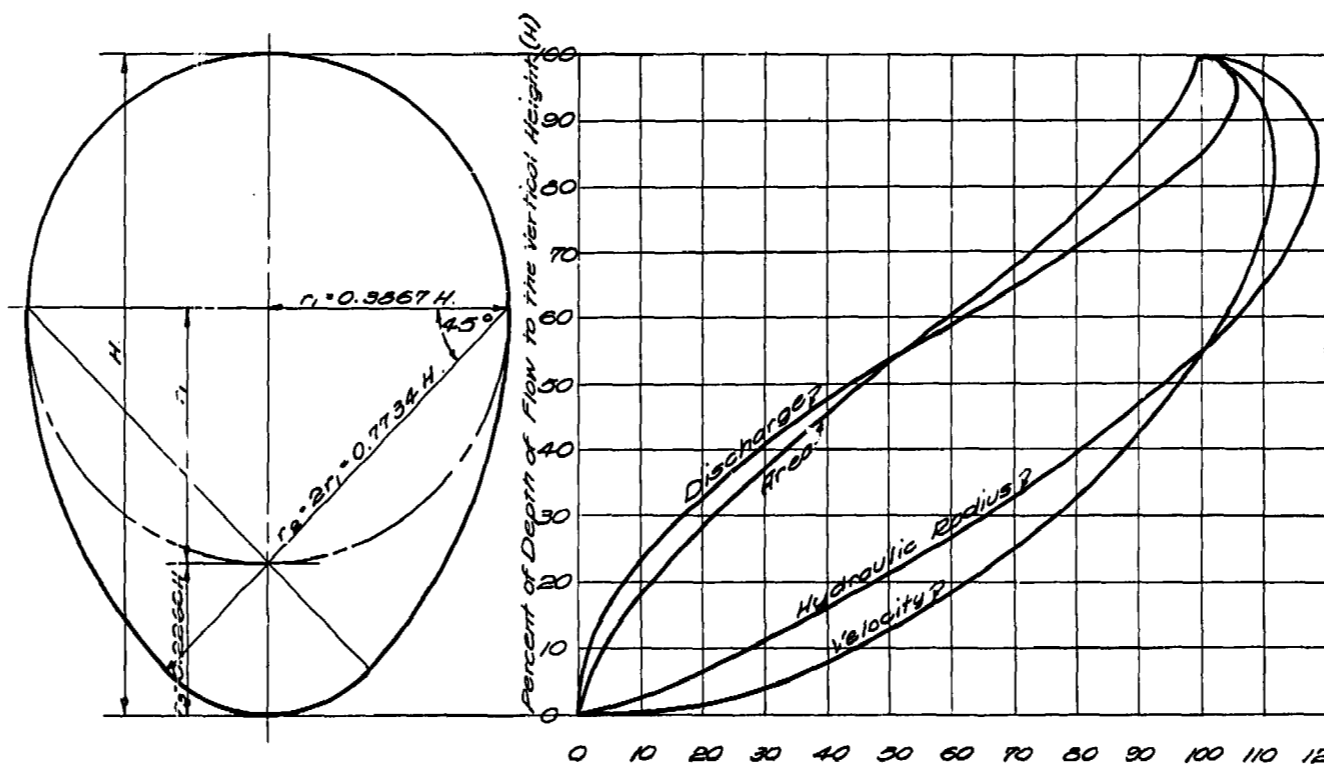


STANDARD CROSS SECTIONS OF CONCRETE SEWERS. Scale - 1/2" = 1'-0"

These sections taken from old drg. of April 19, 1909

For Full Section Area 0.5954 H²
Perimeter 2.7856 H
Hydraulic Radius 0.2137 H

From Hazen-Williams Formula $V = 1.318 C r^{0.63} S^{0.54}$



Area	Perimeter	Hyd. Rad.	Depth of Flow
3.942 r ²	7.809 r	0.553 r	Full
2.626 r ²	4.337 r	0.620 r	2/3 Full
1.025 r ²	2.396 r	0.396 r	1/3 Full

Where r = 1/2 inside width

Sheet 2 of 2 sheets.
Sheet Dwg 14654
" 2 " 14655

Sections of Egg Shaped Sewers

CITY OF WINNIPEG
ENGINEERING DEPARTMENT
W. G. HURST, CITY ENGINEER
& S. TALNTON, DEPUTY CITY ENGINEER

DRAWN BY: [Signature] DATE: April 29, 1952
TRACED BY: [Signature]
CHECKED BY: [Signature]
APPROVED: [Signature]
DRAWING NO. 14655