

A Subdivision
of
Cresmore Park Number Three
Lansing, Michigan

A Thesis Submitted to
The Faculty
of
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by

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PREFACE

Several years ago subdividing began in the South East section of Lansing. This section became known as SYCAMORE PARK.

Later, this area was divided into three divisions, namely: Sycamore Park No. 1, 2, and 3. Subdividing began immediately on Sycamore Park No. 1. Upon completion of the division No. 1, division No. 2 was started and completed. This left Sycamore Park No. 3 undeveloped, therefore, we thought the subdividing of No. 3 would be a suitable thesis project.

APPRECIATION

We wish to express our appreciation for the advice, directions and criticisms of Professors C. L. Allen, L. A. Smith, and the Lansing City Engineering Department concerning the problem we encountered.

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SURVEY

A point on the intersection of the center lines of Pennsylvania Avenue and Lindberg Drive was located and used as a point of beginning for our survey. The traverse was run south down Pennsylvania Avenue to Mt. Hope Avenue, then east down Mt. Hope Avenue to Lindberg Drive to Pennsylvania Avenue where our traverse closed.

Elevation shots were taken along the traverse so as to establish one foot contour intervals.

Subdivision

Corner stakes of the surrounding subdivision were located, and subdividing began at the corner of Lindberg Drive and Harding Avenue. The width of the streets and the shape of the blocks were determined by the features of the adjacent subdivisions. Lot sizes of Sycamore Park Number 3 were slightly increased to those lots in Sycamore Park numbers 1 and 2; smallest being 40 feet by 75 feet, while the largest, a corner lot, being approximately 60 feet by 120 feet.

CURVE DATA

SUNNYSIDE AVENUE

$$I = 40 \text{ degrees } 15'$$

$$R = 1081 \text{ ft.}$$

$$C = 703 \text{ ft.}$$

$$D = 5 \text{ degrees } 30'$$

$$L = 610 \text{ ft.}$$

$$T = 371 \text{ ft.}$$

P.C. = 0+00 at the intersection of the center line of
Sunnyside Avenue and the eastern right of way boundary of
Chapel Avenue.

$$P.T. = 6+10.0$$

DESIGN OF SEWERS

Storm Sewer

A concrete sewer system was used due to the following conditions;

- 1- No immediate combined sewer system in the vicinity.
- 2- Nearness of the Red Cedar River made easy and less expensive disposal of the storm flow.

Initial data covering the sewer system of the adjacent subdivision was obtained from the Lansing Engineering office. Storm sewers were located according to topographical features, and also in accordance with the storm sewers already laid in adjacent areas. A storm sewer was not laid in the block of Sunnyside Avenue between Whithill Avenue and Harding Avenue as the slope of the ground was sufficient to carry the storm flow to the catch basins at the street intersection. Storm sewers were omitted along Lindberg Drive as flumes could be built to carry the storm flow to the river. Storm sewers ranged from 18 inches to 34 inches in diameter. In the design of the storm sewer system, the time of concentration was determined after a short study of the size and type of soil of the watershed. This period was found to be ten minutes. The rainfall formula used to determine the rate of precipitation was $R = \frac{1.71}{t + 10}$. Since our area is a residential area the coefficient of runoff is 0.40.

DESIGN OF STORM SEWER

L	LOCATION	Fr. No.	Incr. of Area (sq. ft.)	Equiv- alent Area (sq. ft.)	Total Area of 100% Inflow		R in/hr.	S ft/s	Slope	Dia in
					Area I	Area II				
1	Whitthill	1	0.32	.40	.950	1.0	4.5	4.5	.0074	18"
2	Whitthill	2	0.42	.40	.970	1.80	4.3	0.05	.0000	18"
3	Sunnyside	3	2.00	.40	1.03	3.15	2.05	13.5	.0074	24"
4	Chapel	4	0.3	.40	.90	.90	.40	3.60	.0100	18"
5	Chapel	5	0.0	.40	1.10	5.10	2.07	00.1	.0000	24"
6		6							.0000	24"

Fr. No.
Given

STATUS OF SMOKE-CHIMNEY (continued)

L	LOCATION	Vol	Time Length	Time of Flow	App- city	DOWN-PIPE		UP-PIPE	
						DOWN	UP	DOWN	UP
1	Whitthill	4.8	200	1.5	5.2	100.0	107.5	100.00	100.00
2	Whitthill	5.4	435	1.2	10.0	107.5	104	110.00	110.00
3	Whitthill	6.0	300	1.0	14.2	104.0	101.0	110.00	110.00
4	Whitthill	6.0	375	1.05	5.1	100.4	101.0	110.00	110.00
5	Whitthill	7.1	305	.95	01	101.0	112.0	110.00	110.00
6		7.1	30		01			110.00	110.00

DESIGN OF STORM SEWER (continued)

L	LOCATION	Vel	Pipe Length	Time of Flow	Coff-cty	GROUND ELEV.		SURFACE ELEV.	
						Top	Bottom	Top	Bottom
1	Whitwell	4.3	390	1.5	5.2	130.0	127.5	122.25	120.00
2	Whitwell	5.4	435	1.3	10.0	127.5	124	119.63	116.36
3	Whitwell	6.0	390	1.0	14.3	124.0	121.0	116.11	113.00
4	Whitwell	6.0	375	1.05	5.1	122.4	121.0	121.40	117.7
5	Whitwell	7.1	305	.95	21	121.0	117.0	113.30	109.01
6		7.1	60		21			109.01	100.30

CONSIDER SHEATHING USED ONCE BEFORE

D.	LENGTH	DEPTH	S/ft	COIL	COIL/ft	C.Frags/ft	S/ft	LINE
15	300	6	.13	.45	.18	.80	318.00	1-2
18	435	6	.01	.45	.18	.80	337.00	2-3
21	380	6	.03	.43	.18	.84	312.00	3-4
18	375	6	.17	.43	.18	.72	300.50	4-5
24	305	6	.06	.43	.18	.87	375.00	5-6
24	60	6	.06	.45	.18	.87	50.00	6-7
							<u>\$1605.70</u>	

COST OF LAYING

300' of 15" pipe	311.7	-----	\$45.63
435' of 18" pipe	114.3	-----	60.01
380' of 21" pipe	118.0	-----	62.40
375' of 18" pipe	312.0	-----	33.75
305' of 24" pipe	301.5	-----	60.72
			<u>\$302.50</u>
60' of 24" pipe	601.5	-----	10.00
			<u>\$305.67</u>

COST OF MANHOLES

M.H.	DEPTH	REQ. PRICE	FOUNDATION	TOP & COVER	OTHERS
1	6	18.00	6.00	18.00	1.00
2	6	18.00	6.00	18.00	1.00
3	6	18.00	6.00	18.00	1.00
4	6	18.00	6.00	18.00	1.00
5	6	18.00	6.00	18.00	1.00
6	6	18.00	6.00	18.00	1.00
		<u>111.00</u>	<u>36.00</u>	<u>108.00</u>	<u>6.00</u>

TOTAL COST ----- \$205.00

COST OF PIPE

300' of 15" pipe	@ .70 -----	\$210.00
435' of 12" pipe	@ 1.00 -----	435.00
300' of 21" pipe	@ 1.75 -----	525.00
375' of 12" pipe	@ .54 -----	201.50
305' of 24" pipe	@ 0.25 -----	76.25
10' of 24" pipe	@ 0.25 -----	2.50
		<u>\$1050.25</u>

ENTIRE COST ----- \$1265.25

CONTRACTORS ----- 707.47
TOTAL ----- \$1972.72ENGINEERS ----- 100.00
TOTAL COST ----- \$2072.72

SANITARY SEWER

Sanitary sewers were laid in all the streets of the subdivision. This makes short-term house sewers possible.

It is estimated that the average sanitary sewer flow will be 100 gal. per capita daily and the density of population, at minimum development, will be forty persons per acre. Since this area is residential, the maximum rate of flow of the sanitary sewer will be taken as 225 per cent of the average. The minimum size of sewer is 8 inches. The minimum cover above the crown of the sewer is 6 feet.

DATA FOR FLOW IN CANTERBURY RIVER

L	LOCATION	Sta. No.	Inflow cfs.	Time of rise hrs.	Inflow cfs.	Total flow cfs.	Max. flow cfs.	Inflow infiltration cfs.	Total infiltration cfs.	Max. flow cfs.
1	Lower	7	0	215	0.5	30.0	00000	0000	0000	0000
2	Upper	8	10	250	1.0	64	0000	0001	0001	0000
3	Upper	10	11	300	1.5	00	0100	0000	0000	0000
4	Upper	11	10	300	0.55	100	0000	0000	0000	0000
5	Upper	12	10	300	0.5	00	0100	0000	0000	0000
6	Upper	13	14	300	0.5	110	0000	0000	0000	0000
7	Upper	15	15	000	1.5	00	0000	0000	0000	0000
8	Upper	17	11	110	0.5	07.0	0000	0000	0000	0000

DATA FOR DESIGN OF CULINARY STEERING SYSTEM.

L	LOCATION	ST. NO. W. W.	Length W. W.	Inlet Flow	Ground Level		Dis. of Pipe	Grade	Fall of Sewer	Invert.			
					at Inlet	at Outlet				at Inlet	at Outlet		
1	Manhole	7	215	.0100	126.0	120.0	0"	.0100	5.3	107.54	101.34	1.7	
2	Manhole	8	250	.0000	131	105.1	0"	.0197	6.0	108.54	115.44	1.7	
3	Manhole	10	205	.05000	105.1	104.1	0"	.0040	1.3	0.1	115.44	114.14	.9
4	Manhole	11	205	.1053	104.1	100.0	10"	.0055	0.1	0.0	117.00	110.00	1.5
5	Manhole	12	205	.0377	100.0	100.0	0"	.0100	0.0	4.0	110.34	113.34	1.5
6	Manhole	14	200	.1337	100.0	117.0	10"	.0130	5.0	5.0	113.0	100.0	4.0
7	Manhole	15	000	.0000	100.0	105.0	0"	.0045	1.6	0.0	117.34	115.74	.9
8	Manhole	17	117	.0103	104.0	107.7	0"	.0040	.47	5.1	115.34	114.07	.9

COST OF SANITARY SEWER

D	LENGTH	DEPTH	C/ft.	2342	3311 box	C. Excav/ft.	C/line
7)8"	315	8'	.37	.52	.33	1.02	342.00
8)8"	350	8'	.37	.52	.33	1.02	372.00
10)8"	395	10'	.32	.63	.34	1.13	397.00
11)10"	395	10'	.32	.63	.34	1.13	452.00
13)8"	375	8'	.37	.52	.33	1.02	402.00
12)12"	360	8'	.33	.60	.30	1.43	514.00
13)8"	360	8'	.37	.52	.33	1.02	361.00
17)8"	117	10'	.37	.52	.33	1.02	127.00
							<u>1851.00</u>

Shorting used for third time.

COST OF LAYING

1740' of 8" pipe	@.053	\$92.25
505' of 10" pipe	@.071	36.60
360' of 12" pipe	@.030	32.40
		<u>\$161.25</u>

<u>N.H.</u>	<u>DEPTH</u>	<u>REF. PRICE</u>	<u>FOUND.</u>	<u>TOP & COVER</u>	<u>STEPS</u>
7	8'	\$25.15	6.00	18.00	2.40
8	8'	25.15	6.00	18.00	2.40
9	8'	25.15	6.00	18.00	2.40
10	10'	27.60	6.00	18.00	2.80
11	10'	27.60	6.00	18.00	2.80
12	8'	25.15	6.00	18.00	2.40
13	8'	25.15	6.00	18.00	2.40
14	8'	25.15	6.00	18.00	2.40
15	10'	27.60	6.00	18.00	2.80
16	8'	25.15	6.00	18.00	2.40
17	10'	27.60	6.00	18.00	2.80
		<u>\$572.45</u>	<u>\$66.00</u>	<u>\$198.00</u>	<u>\$92.00</u>

TOTAL COST -----\$872.45

COST OF PIPE

1742' of 8" pipe	5.30	\$523.00
585' of 10" pipe	2.40	160.00
330' of 12" pipe	3.54	<u>124.00</u>
		<u>\$872.00</u>

TOTAL COST OF SANITARY SEWER SYSTEM

ENTIRE COST	-----	\$4433.70
CONTRACTORS	-----	374.26
	TOTAL	<u>374.26</u>
ENGINEERS	-----	512.42
	TOTAL COST	<u>\$5630.18</u>

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STREET GRADTS

A plan and profile were made of Shubel Avenue, Whithill Avenue, and Skenyvale Avenue. The grade of the center line of each street was determined, and these grades were made to follow as closely as possible the contours of the ground.

Our maximum negative grade was 0.02%, and our maximum positive grade was 1.77%.

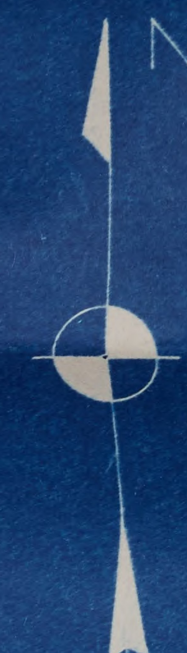
Our minimum negative grade was 1.46%, and our minimum positive grade was 0.50%.

Feb 15 '49

~~CONFIDENTIAL~~

MAP OF CONTOURS AND SUBDIVISION

SCALE 1"=100'
CONTOUR INTERVAL = 1'
STORM SEWER
SANITARY SEWER



SYCAMORE

PARK

NO. 3

SCALE 1"=100'

