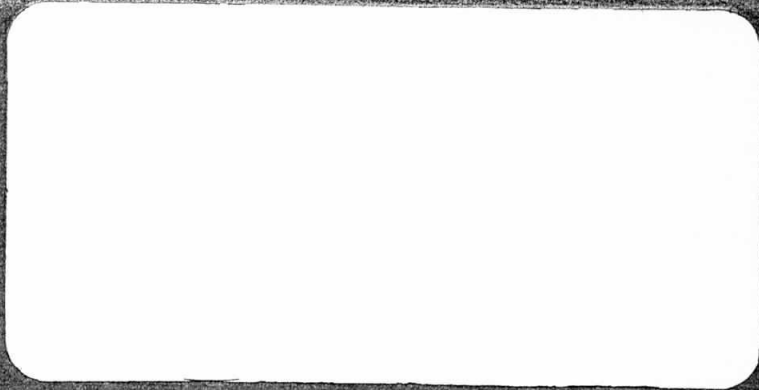


R-10



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Consulting Engineers

WK GROUP

RENO DRAINAGE STUDY

ANALYSIS OF THE
ROBERTS STREET/YORI AVENUE
DRAINAGE DEFICIENCY AREA

Area 7 of 21

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PRELIMINARY

A. INTRODUCTION

The Roberts Street/Yori Avenue drainage deficiency area is a small drainage basin of approximately 40 acres. The basin is bounded on the west by Kirman Avenue, on the north by Curti Drive, on the east by Yori Avenue, and on the south by Thoma Street. The Libby C. Booth Elementary School is located at the corner of Roberts and Yori. (Refer to Figure 1.)

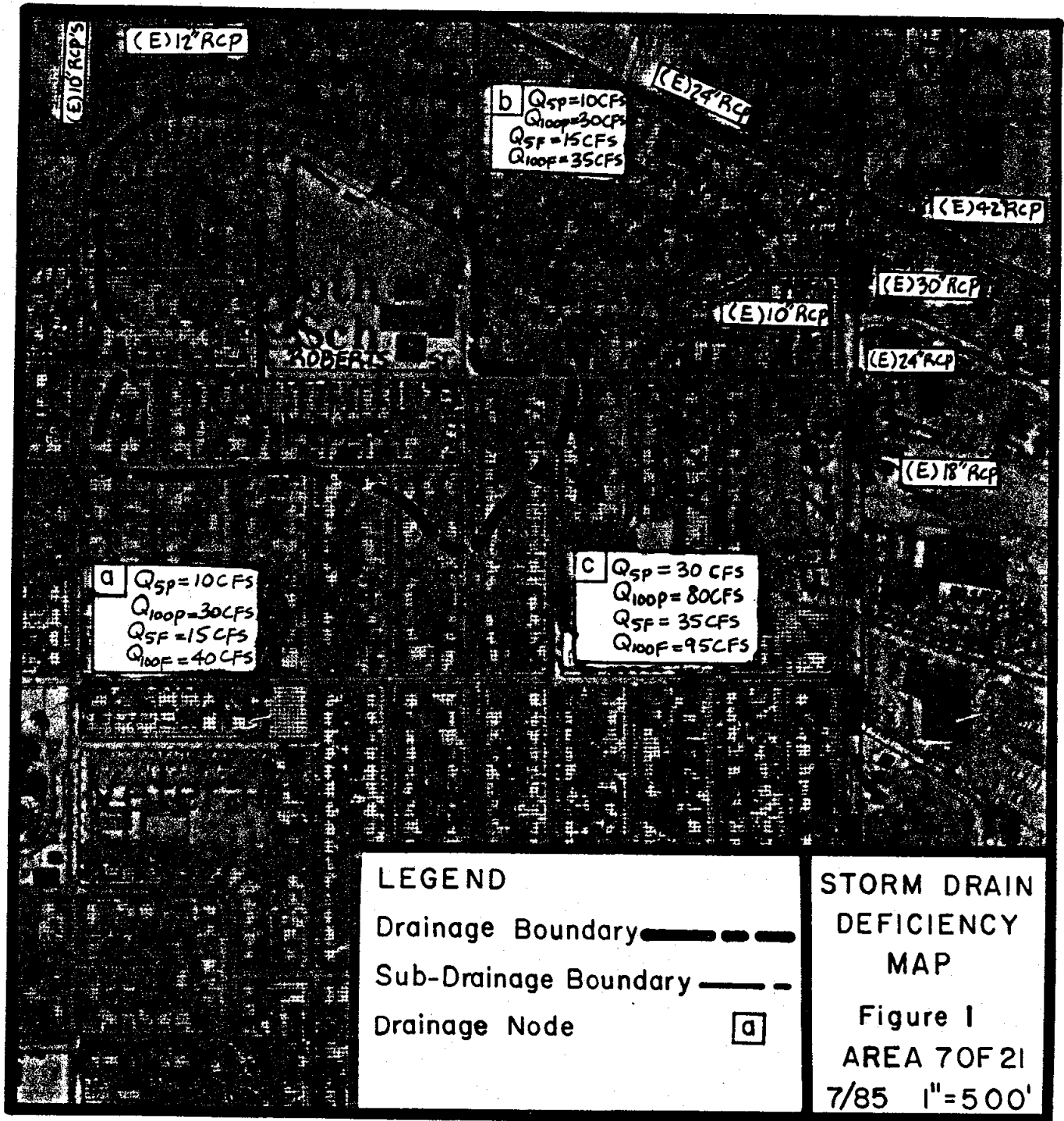
B. FIELD ANALYSIS

The Present Land Use Map shows the drainage area to consist of strictly single family residential. Except for the elementary school, this is pretty much the case.

The Future Land Use Map shows multi-family residential along Karman Avenue (33% of the drainage basin), public facility where the school is located (27% of the drainage basin), and the remainder as single family residential (40% of the drainage basin). This increased development would cause just under a 20% increase in storm runoff.

There is no pipe network within the drainage basin except for several drop inlets that allow flow to cross from one side of the street to the other. The rest of the runoff proceeds as overland and gutter flow.

The intersection of Roberts Street and Yori Way forms a low spot. Sheet flow from all four directions flow to this point, with no real outlet. It appears that the area drains off slowly towards the northwest flowing through yards to Stewart Street, eventually reaching a 10-inch storm drain in Stewart that ties to a 30-inch storm drain in Kietzke.



(E)10'RCP

(E)12'RCP

b $Q_{5P} = 10\text{CFS}$
 $Q_{100P} = 30\text{CFS}$
 $Q_{5F} = 15\text{CFS}$
 $Q_{100F} = 35\text{CFS}$

(E)24'RCP

(E)42'RCP

(E)30'RCP

(E)10'RCP

(E)24'RCP

(E)18'RCP

a $Q_{5P} = 10\text{CFS}$
 $Q_{100P} = 30\text{CFS}$
 $Q_{5F} = 15\text{CFS}$
 $Q_{100F} = 40\text{CFS}$

c $Q_{5P} = 30\text{CFS}$
 $Q_{100P} = 80\text{CFS}$
 $Q_{5F} = 35\text{CFS}$
 $Q_{100F} = 95\text{CFS}$

ROBERTS

There are two low spots on Stewart Street. One is located at the intersection with Ballentyne Way and one is located at the intersection with Katherine Drive. Ballentyne Way flows north to Stewart. There appears to be a low point although flows tend to go east on Stewart to the intersection of Katherine. Flows also travel from the west on Stewart to Katherine from the intersection with Yori Avenue. From here flows cross southeast across the Libby C. Booth Elementary School grounds to Roberts and Yori.

C. ESTIMATED STORM RUNOFF

Estimated storm runoff is calculated for both the 5-year and the 100-year storm at selected nodes. These nodes are shown on Figure 1, the project boundary map. Table 1 summarizes these nodes, giving location, description of node, capacity of node and estimated storm runoff at the node. The existing capacity assumes inlet control. Generally, a range is given. The lower value assumes no head at the inlet while the higher value is at maximum head on the culvert.

It should be noted that winter and summer storms are of approximately equal intensity and storm runoff calculations are the same for either case (refer to the wet and dry isopleth maps in the Reno Drainage Study Preliminary Report: Deficiency Areas within the City Limits, December 1984).

D. CONCLUSIONS

The intersection of Roberts Street and Yori Avenue is the low point in the drainage basin. There is no easy exit for flows and significant street flooding can occur for at least a half block in all directions during a storm.

In addition, street flooding occurs at local low spots on Stewart Street.

Table 1. Roberts Street/Yori Avenue Drainage Deficiency Area
Facilities Summary

Node and Location	Existing Storm Drainage System	Existing Capacity (CFS)	Estimated Flows Present Land Use		Estimated Flows Future Land Use	
			Q ₅ (CFS)	Q ₁₀₀ (CFS)	Q ₅ (CFS)	Q ₁₀₀ (CFS)
a - Stewart and Ballentyne	None existing	0	10	30	15	40
b - Stewart and Katherine	None existing	0	10	30	15	35
c - Intersection of Roberts and Yori	None existing	0	30	80	35	95

Several alternatives are considered as possible solutions to the flooding problem. It may be possible to regrade portions of Stewart so flow can travel east to the 10-inch storm drain that ties to a 24-inch storm drain on Kietzke. It may also be possible to regrade a portion of Robert Street. The actual street elevation at Roberts and Yori is higher than the elevation at Roberts and Kietzke. There is a high point between Kietzke and Yori, stopping flows from proceeding east on Roberts.

An alternative solution would be a storm drain pipe system. A pipe system could be installed on Stewart Street beginning just east of Kirman Avenue. It could tie to the existing 10-inch storm drain on Stewart just west of Kietzke, although this pipe would need to be upsized. A pipe could be installed from Roberts and Yori, north on Yori, tying to the proposed main in Stewart.

An alternate routing would be to cross from Stewart to Roberts, either through the school grounds or on Yori and continue east on Roberts to Kietzke.

A third alternative routing to Mill Street on Gould does not appear to be feasible after field analysis of the flow lines of the existing storm drain on Mill Street.