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WKGROUP

RENO DRAINAGE STUDY

ANALYSIS OF THE
<u>UNIVERSITY DRAIN DRAINAGE</u>
<u>DEFICIENCY AREA</u>

AREA 17 OF 21

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PRELIMINARY

A. INTRODUCTION

The University Drain drainage deficiency area is a large drainage basin of approximately 1250 acres that includes some of the major storm drainage network within the City.

The basin extends essentially from Wells Avenue east to McCarran Blvd. The drainage basin west of Kietzke is quite wide, extending from Second Street in the north to just south of Roberts Street in the south. It narrows to a band on either side of Mill Street east of Kietzke but widens again to include a significant portion of Cannon Airport, with Mill Street as the northern boundary. (Refer to Figure 1 appended to the back of this report.)

B. FIELD INVESTIGATION

The Present Land Use Map shows the area to be composed largely of commercial and industrial with little residential land. Approximately 31% of the area is shown as agricultural, open space and vacant. The Future Land Use Map shows almost no open space or park, (less than 1%) with the majority of the land shown as manufacturing, office, distribution and warehouse, public facilities and commercial with less than 8% as residential.

This increased development would cause over a 30% increase in storm runoff. This is significant especially as it affects such a large part of the existing City storm drain system.

The storm drain system begins at Wells Avenue. An 18-inch storm drain starts at Wells and Ryland and runs east increasing to 21-inch at the intersection of Kirman Avenue. A 15-inch storm drain begins on Mill Street at the intersection with Locust traveling east. These two storm drains tie together at the intersection of Ryland and Mill and proceed east on Mill as a 24-inch storm drain.

A 30-inch storm drain from the south on Kietzke ties to the 24-inch storm drain on Mill. East of Kietzke, the pipe increases to a 42-inch RCP.

Between Kietzke and the U.S. 395 overpass, two subdrainages tie to the system; a 24-inch storm drain from the north on Golden Lane and a 24-inch storm drain from the south on Market Street. At the U.S. 395 overpass, the storm drain on Mill increases to a 48-inch RCP. Just east of Matley Lane the storm drain increases to a 54-inch RCP.

At the intersection of Mill and Telegraph, the storm drain increases to 60-inch and approximately 1300 feet farther east the pipe turns south, discharging into a ditch. A short 24-inch RCP on Mill from the east ties to this same manhole.

Just east of this point, a 24-inch storm drain begins on Mill and extends past Edison before it turns north as a 48-inch pipe discharging to the Truckee River. This pipe system is outside the basin in question.

The flows from the 60-inch storm drain on Mill Street proceed south in an open ditch along the east side of the main landing strip at Cannon International Airport. Approximately 4800 feet south of Mill Street it turns east as the University Drain crossing a private road within the airport complex via an 8'x6' box culvert. A short distance east, the flows cross South Rock Blvd. via dual 8'x4' box culverts.

Two drainage systems enter from the north just east of South Rock Blvd. An 18-inch to 27-inch storm drain proceeds south on South Rock Blvd., beginning approximately 500 feet south of Mill Street. It turns east in dual 24-inch RCP's approximately 1800 feet north of Energy Way and discharges into an open channel flowing south.

Farther south on South Rock Blvd a short 18-inch storm drain proceeds south and then east as a 24-inch pipe discharging to the channel. A third storm drain, 18-inches in diameter, proceeds south on South Rock Blvd. then turns east on Energy Way discharging into the channel. The channel crosses Energy Way via a 60"x38" CMP arch. Field investigation shows only about 26-inches in height rather than 38 inches in height shown on the existing mapping. A short distance downstream flows empty into University Drain.

The second drainage system mentioned above is a 12-inch to 18-inch storm drain that proceeds south on Edison Way and discharges into University Drain.

Approximately 450 feet east of Edison Way a 30-inch RCP pipe proceeds south from Mill Street for approximately 1000 feet discharging into an open channel. Rather than discharging into University Drain, it crosses over the top of it via a 24-inch CMP discharging into the field on the south side of the ditch. At this same location, a dirt road crosses University Drain. A 48-inch RCP is installed across this road to handle the University Drain flows. There is a great deal of trash and brush collected in the ditch on the upstream side of this road that greatly reduces the ditch and pipe capacity.

University Drain crosses Longley Lane via a 48-inch RCP that shows considerable inlet siltation. There is also a 36-inch steel perforated pipe at a somewhat higher elevation that acts as an overflow pipe. Approximately 450 feet farther east, University Drain, crosses McCarran Blvd. via dual 8½'x6' box culverts. One side is badly silted in.

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 appended at the back of this report. 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.

The storm flows in certain cases decrease farther downstream in the drainage. (Refer to Table 1 nodes b, c, d and e.) There are several reasons for this. Although the drainage area increases, the runoff coefficient may decrease if there is lower density development in the downstream portion of the drainage. In addition, the time of concentration increases in the larger drainage basin, thus decreasing the storm intensity on the rainfall IDF curves. Thus, the combined reduced "c" and "i" values in the rational formula will, at times, out-weigh the increased area, giving a lower runoff value.

It should be noted that the storm runoffs are based on summer storms, which give more conservative values than the winter storms. (Refer to the wet and dry isopleth maps in the Reno Drainage Study Preliminary Report: Deficiency areas Within the City Limits, December, 1984.)

D. CONCLUSION

It is apparent from Table 1 that the upper drainage, generally west of U.S. 395, is undersized for even the present 5-year storm event. East of U.S. 395, the storm drain on Mill Street is adequate.

The small subdrainage system draining Bible Way and Telegraph Street east on to Vassar Street (node f) is undersized.

The University Drain crossing at South Rock Blvd. is adequate although just downstream of this point, an existing 48-inch RCP across a dirt road is inadequate. This could cause the entire system to back up upstream. The channel itself is filled with garbage and brush just upstream of the 48-inch RCP inlet further restricting its capacity and the capacity of the channel.

The 48-inch RCP and 36-inch steel overflow pipe crossing Longley Lane is significantly undersized for even the present 5-year storm. The large dual box culverts crossing McCarran Blvd. just downstream are adequate even for the predicted 100-year storm.

The upper reaches of the drainage basin are fairly heavily developed. The existing storm drain system is somewhat undersized. There is little alternative except to upsize the system as there is little available space for retention ponds or basins.

University Drain is undersized at a couple of locations which can cause flooding upstream as the system back up. It is suggested that adequate structures be installed to reduce the flooding threat.

It may be possible to reroute a portion of flow on Mill Street north to the Truckee River rather than bringing all flows south through the airport complex to the University Drain. It may also be feasible to route flows to the MGM lake. The storm drain system on Mill in this location is adequate, thus the only purpose of routing flows north would be to reduce downstream flows.

There are presently significant undeveloped areas in the lower drainage basin. There is a fair amount of open area within the airport complex. A problem with using this area as a storage basin is that the increased standing water could bring in water fowl. This can create problems with the air traffic. Farther downstream, between Edison Way and McCarran Blvd., as well as the area south of University, there is a significant amount of open and marshy area that could perhaps be used for overflow.

Table 1 - University Drain Existing Storm Drainage Facilities

Node and Location	Existing Storm Drainage System	Existing Capacity (cfs)	Estimated Flows Present Land Use		Estimated Flows Future Land Use	
			Q5(cfs)	Q100(cfs)	Q5(cfs)	Q100(cfs)
a - Intersection of Ryland Street and Mill Street.	24" storm drain	13-26	90	240	100	260
b - Intersection of Mill Street and Kietzke Lane	24" to 42" storm drain	13-26 50-80	115	315	125	335
c - Mill Street @ U.S. 395 overpass	42" to 48" storm drain	50-80 70-110	110	300	140	370
d - Intersection of Mill Street and Telegraph Street	54" to 60" storm drain	95-140 125-180	95	220	120	285
e - Mill Street where S.D. discharges south to channel	60" storm drain	125-180	95	230	115	280
f - Outlet of S.D. just east of Vassar and Telegraph intersection	Dual 24" RCP's	26-50	55	155	55	155
g - Storm drain turning east off South Rock Blvd. just north of Energy Way	Dual 24" RCP's	26-50	15	35	30	80
h - Culvert crossing of Energy Way	60"x38"	60-100	25	65	45	110
i - University Drain crossign of South Rock Blvd.	Dual 4'x8' RBC's	370-880	120	255	135	290

Table 1 - Continued

Node and Location	Existing Storm Drainage System	Existing Capacity (cfs)	Estimated Flows Present Land Use		Estimated Flows Future Land Use	
			Q5(cfs)	Q100(cfs)	Q5(cfs)	Q100(cfs)
j - University Drain @ Longley Lane and McCarran Blvd.	48" RCP &	70-175	230	455	305	600
	36" steel pipe	35-100				
	Dual 8½'x6' RBC's	730-990				

LEGEND

Drainage Boundary

Sub-Drainage Boundary

Drainage Node [a]

STORM DRAIN DEFICIENCY MAP

FIGURE I

AREA 17 OF 21

9/85

1" = 500'