RP

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October 30, 1089
RP:0115

Mr. Manabu Tagomori
Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

(SCAP-MA-59)
Stream Channel Alteration Permit
Kipapa Stream
Oahu

In response to your request of September 26,1989, we have briefly reviewed the information provided for the Stream Channel Alteration Permit for Kipapa Stream, with the assistance of Paul Ekern, Water Resources Research Center; and C. Anna Ulaszewski, Environmental Center. There are several issues which we feel deserve further attention.

The flow volume and fall height is greater than that generally recommended for the use of a flume; thus, the flume must be carefully engineered in order to prevent overflow and consequent undermining of the soils along the sides of the flume. (See Schwab, Frevert, et al., 1966, enclosed.)

According to the application documentation, erosion in the terminus area of the drainage structure will be reduced due to the fact that it will only be inundated by a ten-year flood or larger. The rationale for this statement is unclear and should be clarified prior to permitting. While the erosion may be reduced, how much erosion is expected to occur due to this proposed change in drainage?

Will the proposed project change the profile of Kipapa Stream in the area of discharge? Is this reach of the stream presently stable?

As reported in this document, urban run-off does contain high concentrations of nutrients, oxygen-consuming wastes (BOD), pathogens, and toxic substances such as pesticides, heavy metals and petrochemicals. While high rainfall will result in dilution and rapid transport, these substances, some of which are not now present in the runoff, will be introduced into Kipapa Stream and its receiving waters. Will this have have a long-term effect on the fauna and flora of the stream and its receiving waters?

The issues we have identified should be addressed prior to approval of this permit.

Thank you for the opportunity to comment on this document.

Yours truly,

Jacquelin N. Miller

Jacquelin Miller
Associate Environmental Coordinator

cc: OEQC
L. Stephen Lau
Paul Ekern
C. Anna Ulaszewski

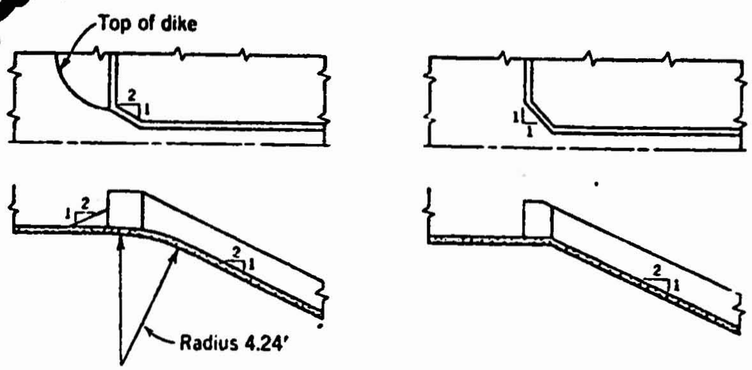
of energy are accomplished in either a straight apron or a Morris and Johnson stilling basin. Dimensions of the straight apron are given in Fig. 11.8. Dimensions for the Morris and Johnson stilling basin are given in Fig. 11.9. For larger structures the Morris and Johnson outlet is preferred, as it results in a shorter apron and the transverse sill induces a hydraulic jump at the toe of the structure. The longitudinal sills serve to straighten the flow and prevent transverse components of velocity from eroding the side slopes of the downstream channel. The flow pattern through a Morris and Johnson stilling basin is shown in dimensionless form in Fig. 11.10.

The stilling basin design for the box-inlet drop spillway is given in Fig. 11.11.

CHUTES

Flumes or chutes carry flow down steep slopes through a concrete-lined channel rather than by dropping the water in a free overfall.

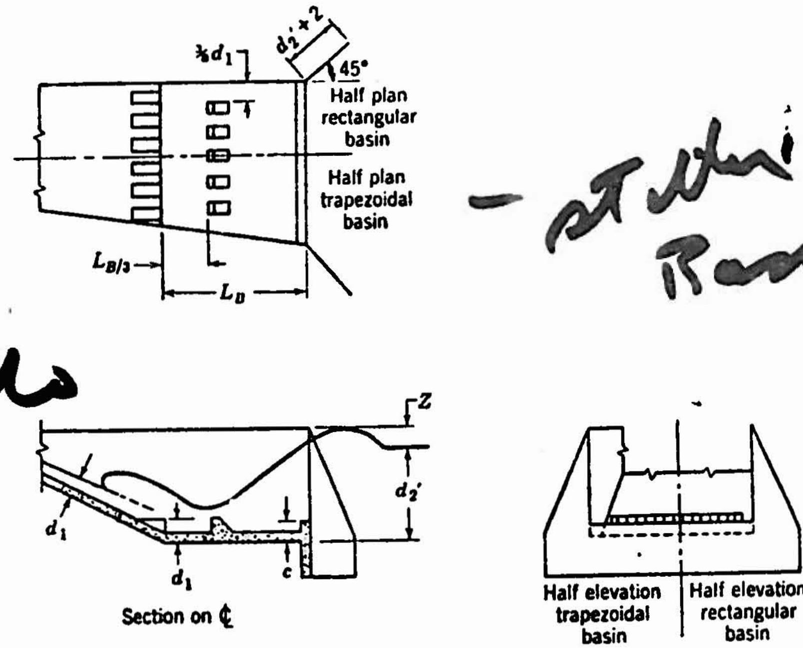
11.6. Function and Limitations. Chutes may be used for the control of heads up to 16 or 20 ft. They usually require less concrete than do drop-inlet structures of the same capacity and drop. However, there is considerable danger of undermining of the structure by rodents, and, in poorly drained locations,



(a) Wisconsin-type chute *(b)* 2:1 Chute

seepage may threaten foundations. Where there is no opportunity to provide temporary storage above the structure, the flume with its inherent high capacity is preferred over the drop-inlet pipe spillway. The capacity of a chute is not decreased by sedimentation at the outlet.

11.7. Design Features. *Capacity.* Flume capacity normally is controlled by the inlet section. Inlets may be similar to those for straight-inlet or box-inlet drop spillways, and in



(Design formulas)

$$L_B = \frac{4.5d_2}{F^{0.38}}, \text{ for } 3 < F < 300 \qquad F = \left(\frac{v_1}{gd_1}\right)^{1/2}$$

Floor blocks to occupy 40 to 55 per cent of stilling basin width.

$$c = 0.07d_2, \qquad z = d_2/3$$

$$d_2 = (-1 + \sqrt{8F + 1})\, d_1/2$$

$$d'_2 = 1.4F^{0.46}d_1$$

d_2 = theoretical tailwater depth

d'_2 = actual tailwater depth

[illegible] (SAF) Stilling basin (Redrawn