APPLICATION METHOD FOR THE GEOMETRIC DESIGN OF THE TSHWANE TYPE KERB INLET.

TERMINOLOGY

Kerb Inlet	-	Catchpit with upstream and downstream transition sections.
Effective inlet length	-	The combined length contributing to the inlet capacity of the kerb inlet, which comprise the catchpit (CP) and the downstream catchpit transition (DCT). See adjacent drawing.
Actual length of the structure (LENGTH)	-	Effective inlet length + 0,5m based on findings from Grobler (1994). See adjacent drawing.
Downstream catchpit transition (DCT)	-	Length always equals 1,0m for design purposes, based on findings from Grobler (1994), even where a 2,0m-catchpit transition section is constructed at sloping kerbs. See adjacent drawing.
Upstream catchpit transition (UCT)	-	Length to be calculated according to Table A. Maximum length of transition section also according to Table A. See adjacent drawing.
Catchpit (CP)	-	Length to be calculated according to Table A. Minimum length of catchpit section is 1,5m. Maximum length is 6,0m. See adjacent drawing.

EXAMPLE 1

Determine the length of a kerb inlet to intercept a kerb flow of 98 l/s in a road with a longitudinal slope op 4%.

STEP 1: Determine the EFFECTIVE INLET LENGTH for a kerb flow of 98 l/s from the design curves. Effective inlet length = 8,5m

STEP 2: Determine the ACTUAL LENGTH OF THE STRUCTURE.

LENGTH = Effective inlet length + 0,5m
= 9,0m

STEP 3: Determine the CATCHPIT LENGTH and UPSTREAM CATCHPIT TRANSITION LENGTH.
Calculate the Froude number and from Table A calculate the CATCHPIT LENGTH as follows:

$$\frac{UCT}{CP} < 6$$

Therefore UCT < 6 x CP

LENGTH	=	UCT	+	CP	+	DCT
9,0m	=	(6 x CP)	+	CP	+	1,0m
CP	=	1,14m				

Always round up to the nearest 0,5m with CP (minimum) = 1,5m.

Thus CP = 1,5m

Calculate the UPSTREAM CATCHPIT TRANSITION LENGTH:

LENGTH	=	UCT	+	CP	+	DCT
9,0m	=	UCT	+	1,5m	+	1,0m
Thus UCT	=	6,5m				
However UCT (maximum)	=	6,0m				

Recalculate the CATCHPIT LENGTH:

LENGTH	=	UCT	+	CP	+	DCT
9,0m	=	6,0m	+	CP	+	1,0m
CP	=	2,0m				

RESULT:
- UPSTREAM CATCHPIT TRANSITION LENGTH (UCT) = 6,0m
- CATCHPIT LENGTH = 2,0m
- DOWNSTREAM CATCHPIT TRANSITION LENGTH (UCT) = 1,0m or 2,0m depending on type of adjoining kerb.

AKNOWLEDGEMENT

Information on this drawing has been obtained from the document:

VERIFICATION OF THE INLET CAPACITIES OF MODIFIED STORMWATER KERB INLETS AND THE DEVELOPMENT OF NEW DESIGN CURVES, GROBLER, JP (1994)

MEng (Civil) Thesis at the University of Stellenbosch, March 1994

EXAMPLE 2

Determine the capacity of a kerb inlet comprising a 3,0m - upstream catchpit transition, a 3,0m - catchpit section and a 2,0m - downstream catchpit transition in a road with a longitudinal slope of 2%.

STEP 1: Determine the ACTUAL LENGTH OF THE STRUCTURE

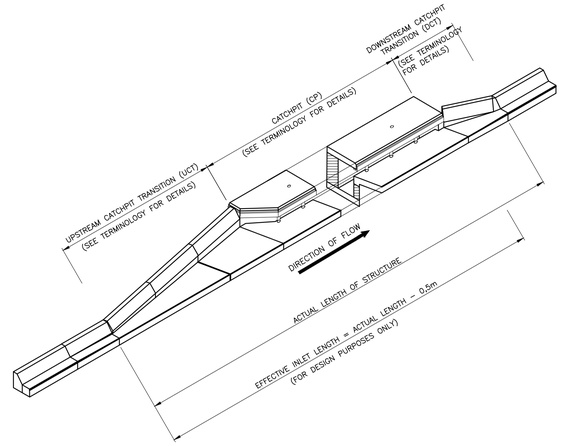
LENGTH	=	UCT	+	CP	+	DCT
	=	3,0m	+	3,0m	+	1,0m (not 2,0m)
	=	7,0m				

STEP 2: Determine the EFFECTIVE INLET LENGTH

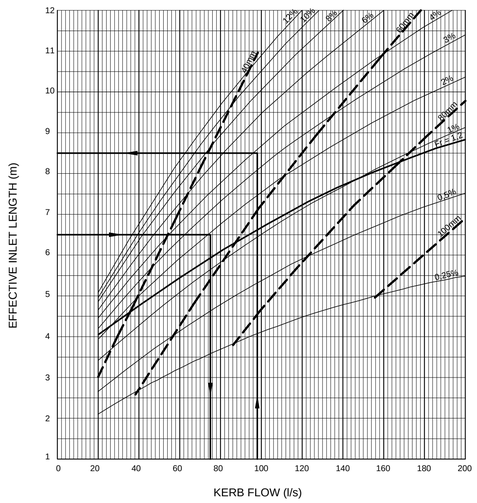
Effective inlet length	=	LENGTH	-	0,5m
	=	7,0m	-	0,5m
	=	6,5m		

STEP 3: Determine the kerb flow for an EFFECTIVE INLET LENGTH of 6,5m from the design curves.

RESULT: - Kerb Flow = 75 l/s



ELAVATION OF KERB INLET COMPRISING CATCHPIT AND TRANSITION SECTIONS



LEGEND:
- EFFECTIVE KERB INLET LENGTH AT SPECIFIED ROAD GRADIENT
- DEPTH OF FLOW AT KERB (mm)
- FROUDE NUMBER = 1,2

CURVES DEPICT 80% INTERCEPTION AT SPECIFIED STREETFLOW

DESIGN CURVES FOR TSHWANE TYPE STORMWATER KERB INLET

TABLE A: DESIGN CRITERIA FOR UPSTREAM CATCHPIT TRANSITION LENGTH

	FROUDE NUMBER < 1,2	FROUDE NUMBER > 1,2	
		LONGITUDINAL SLOPE OF ROAD	
		< 3%	> 3%
MAXIMUM RATIO: Upstream Catchpit Transition length / Catchpit length (UCT/CP)	2	2	6
MAXIMUM Upstream Catchpit Transition length (UCT maximum)	4m	5m	6m

NOTES AND SPECIFICATIONS

AMENDMENTS

NR.	DATE	APPROVED	DESCRIPTION	PAR.

DESIGNED: P.A. ODENDAAL Pr.Eng. (SIGNATURE / DATE)
DRAWN: S. AUDIE
DESIGN CHECKED BY: P.A. ODENDAAL Pr.Eng. (SIGNATURE / DATE)
INFRASTRUCTURE TECHNICAL INFORMATION MANAGEMENT: D.J. CHALMERS (SIGNATURE / DATE)

PROJECT STATUS

CONCEPT DRAWING | TENDER DRAWING | APPROVED FOR CONSTRUCTION DRAWING | AS BUILT DRAWING

PROJECT ENGINEER (CONSULTANT)
INITIALS AND SURNAME / SIGNATURE AND Pr. No. / DATE
INSPECTOR OF WORKS (CITY OF TSHWANE):
INITIALS AND SURNAME / SIGNATURE AND Pr. No. / DATE

CONSULTANT DETAIL

CITY OF TSHWANE
ROADS AND TRANSPORT DEPARTMENT

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DRAWING APPROVED BY EXECUTIVE DIRECTOR
Ms. L. V. Kegakilwe-Piki
SIGNATURE: DATE:

LOCATION OF PROJECT:

TYPICAL STANDARD DETAILS

DESCRIPTION OF PROJECT

TSHWANE TYPE KERB INLET
DESIGN CURVES AND APPLICATION METHOD

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For Internal Approval
RECIEVED SIGN WHEN APPLICABLE
DIRECTOR: INFRASTRUCTURE PROVISION (SIGNATURE / DATE)
DIRECTOR: INFRASTRUCTURE CONSTRUCTION (PROJECT) MANAGEMENT (SIGNATURE / DATE)
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0 10 20 40 60 80m
SCALE 1:1000

DRAWING LOCATION