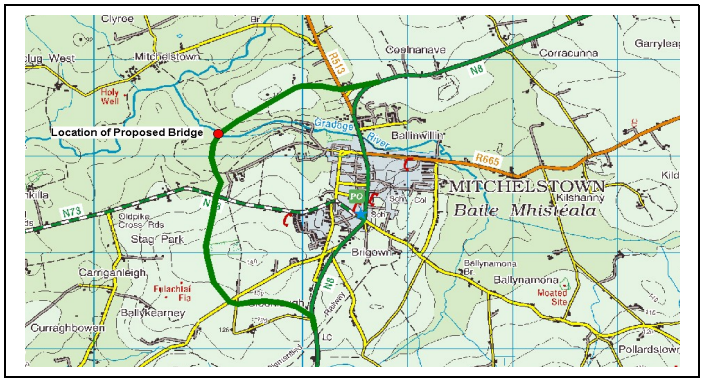
APPLICATION FORM AF-50:
CONSENT UNDER SECTION 50, ARTERIAL DRAINAGE ACT, 1945

APPLICATION DETAILS				
Name of Applicant:				
Company / authority:				
Address:				
Tel:	Fax:	Email:		
Date of Application:				
Client (if appropriate):				
BRIDGE DETAILS				
Bridge Name: N8 Road Improvement Scheme – Gradoge River Bridge B5				
Purpose (ring appropriate box)	**Public Road**	Private Road	Footbridge	Other
Road Number (or Name): County road 303				
River: **Gradoge River**		Catchment: Gradoge		
County: **Cork**		Grid Reference: **E:87944.6088 N:112829.7333**		
Location: The bridge is to be located at Chainage 2820 on the proposed Mitchelstown Relief Road at the point where it crosses the Gradoge River				
Type of Works (ring appropriate box	New Bridge	Replacement Bridge	Alterations	



Location Plan Scale 1:2500

OPW standards for Section 50 consent have been revised since the submission of this application. This application is for illustrative purposes only. Some amendments and annotations have been made. No drawings have been provided with the examples. Please refer to the current Section 50 brochure for revised standards.

SUPPORTING INFORMATION FOR SECTION 50 APPLICATION

1. Design Details/drawings and Locality Map

The bridge is located on the proposed N8 Mitchelstown Relief Road at Chainage 2820 where the relief road crosses the Gradoge River. The Proposed bridge will be located at the grid Reference 180190 E; 113262 N. A location plan can be found in Attachment 1. Drawing No. 001RB shows details of the proposed bridge and is included in Attachment 1.

The structure will consist of a single span bridge made from precast bridge beams, supported on sleeved piled abutments located behind reinforced earth walls.

The river bridge consists of a single 15.8m skew span and is designed as integral with its piled abutments. The skew of the bridge is approximately 8°.

The deck will consist of TY9 beams with special TY edge beams, spaced at nominal 765mm centres. An in-situ infill deck slab will be poured between the beams to create a composite deck.

2. Design Standard (years)

For rural areas the OPW recommends a design flood standard of 1:25 years. The area in the vicinity of the bridge can be classified as rural. However given the location of the bridge in relation to the water treatment works upstream of the bridge and to allow for any future development it was deemed prudent to use a 1:50 year flood standard with additional checks being carried out for the 1:100 year flood. *(Current OPW policy would require a design flood standard of 1:100 years for this bridge - August, 2007)*

3. Design Flows

The catchment of this watercourse is 31.9 km^2 draining the western half of the Glenatlucky Mountain and a large part of the northern side of the Skeheen Mountain as well as Mitchelstown and surrounding area.

Flood estimations were undertaken using the Unit Hydrograph Method of Flood Estimations contained in the Methods of Flood Estimation: A guide to the Flood Studies Report, Report No. 49, 1978, Institute of Hydrology, Wallingford Oxon. Details of the estimations can be found in Attachment 2.

Using this method the 1:50 and 1:100 year design floods were estimated as 30.1 and 35.4 m^3/s respectively.

4. Design Hydraulic Capacity

Modelling Approach

The internationally recognised HEC RAS river analysis software (U.S. Army Corps of Engineers, http://www.hec.usace.army.mil/software/hec-ras/) was used to model the Gradoge River in the vicinity of the proposed bridge. The hydraulic model of the river have been constructed in order to assess the existing regime and to determine the impact, if any, that the proposed bridge crossing will have on the Design Flood Level.

Design Flood Level

The impact of the proposed bridge on flood levels has been determined by modelling the river with and without the bridge crossing. The modelling results demonstrate that the proposed bridge crossing does not significantly affect either upstream or downstream design flood levels.

The model predicts an increase in design flood level, at the upstream face of the bridge of 200 mm. This increase is caused by the throttling effect of the river as it flows through the bridge structure. The predicted increase in the water level is highly localised. The model also demonstrates that the design flood level, 100 m upstream of the bridge is likely to increase by 100 mm. It is considered that increases in the design flood levels further upstream will be insignificant. No urban areas are at increased risk of flooding as a result of the proposed bridge crossing. The water treatment works which is located approximately 800m upstream will not be affected.

Free Board

The predicted flood level at the bridge is 76.1 m for the 1:50 year event. Assuming the bridge soffit is at 80 m (based on the minimum road level of 81 m) there is at least 3.8 m of free board for the 1:50 year event.

5. Other information

Scour Protection Measures

The depth average velocity upstream of the bridge is 1.8 m/s. The proposed bridge crossing does not increase design velocities in the river channel. The abutments of the bridge are to be protected from scouring by using reinforced earth embankments. Scour protection measures are subject to detailed design.

ATTACHMENT 1

Locality Map

And Drawing No.001RB (Gardoge River Ridge)

ATTACHMENT 2

Estimation of the 1 : 50, 1 : 100 and 1 : 250 Flood Events

Refer to Bridge No. 5 for N8 Mitchelstown Relief Road, Gradoge River Bridge

Flood Estimates for Bridges 5
From Methods of Flood Estimation: A Guide to the Flood Studies Report, Report No. 49, 1978, Institute of Hydrology, Wallington Oxon

Step	Parameter	Reference	Unit	Return Period		
				50 yr	100 yr	250 yr
Step 1	Area		km2	31.857	31.857	31.857
	MSL		km	8.275	8.275	8.275
	H85%		m	165	165	165
	H10%		m	90	90	90
	S1085		m/km	12.085	12.085	12.085
Step 2	SAAR		mm	1100	1100	1100
Step 3	M5 2-day	Fig: 11 3.1	mm	75	75	75
	R (M5 1-hr/M5 2-day	Fig: 11 3.5	%	0.25	0.25	0.25
	M5 24-hr/M5 2-day	Table II.3.7 or Table 6.21	%	0.817	0.817	0.817
	M5 24-hr		mm	61.25	61.25	61.25
	M5 1-day		mm	55.18	55.18	55.18
	ARF (1day)	Fig: 6.58		0.976	0.976	0.976
	SMDBAR	Fig: 1 4.19	mm	5	5	5
	RSMD		mm	48.9	48.9	48.9
Step 4	URBAN	factor	%	0.15	0.15	0.15
Step 5	URBT			1.05	1.05	1.05
Step 6	Tp		hr	3.9	3.9	3.9
Step 7	T		hr	1	1	1
Step 8	Tp		hr	3.9	3.9	3.9
Step 9	D		hr	8.2	8.2	8.2
Step 10	SRP		year	81	140	300
Step 11	M5 (D) / M5 2-day	Table II.3.7 or Table 6.21		D = 8-hr	D = 8-hr	D = 8-hr
	rx/Dy		%	0.54	0.54	0.54
	M5 (D)			M5 (8 Hours) =	M5 (8 Hours) =	M5 (8 Hours) =
			mm	40.703	40.703	40.703
	MTx/M5y	Table II.2.7 or 9	MT / M5	1.687	1.934	2.604
				M81 =	M140 =	M300 =
	MT		mm	68.7	78.7	106
	ARF (hr)	Fig: 6.58		0.94	0.94	0.94
	P		mm	64.5	74	99.6
Step 12	CWI	Fig. 1.6.62		124	124	124
	0.5	S5	%	0	0	0
Step 13	Soil Index	Fig. 1.4.18	weighted	0.3	0.3	0.3
Step 14	SPD		%	30.5	30.5	30.5
Step 15	PR		%	35.7	36.6	39.2
	D/T			8.2	8.2	8.2
	Tp/T			3.9	3.9	3.9
Step 2	CN	Fig. 6.64		41	41	41
Step 3	Q		m3/S	30.1	35.4	51