

**P1227-8 Ardderroo Wind Farm, Co. Galway**  
**Appendix 9.3 - Road Crossing Culvert Assessment**

<b>Crossing ID</b>	<b>Location Description</b>	<b>Easting</b>	<b>Northing</b>	<b>Channel Dimensions (m)</b>	<b>Water Depth (m)</b>	<b>Catchment Area (km2)</b>	<b>100 Year Flow (m3/s)</b>	<b>Mimimum Pipe Culvert Diameter Required (mm)</b>
P1	Proposed leading towards T20	110915	232041	1.1W x 1.2D	0.83	0.45	0.770	900
P2	Proposed crossing north of T10	113419	234616	1.5W x 0.5D	0.3	0.9	1.427	900
P3	Owenboliska River crossing	112316	233116	6.6W x 1D	0.9	23	25.537	Clear Span bridge Proposed
P4	Temporary construction road	116677	236566	2W x 1.5D	0.4	1.4	2.115	1100

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Crossing ID	Location Description	Easting	Northing	Culvert Type	Culvert 1 Dimensions (m)			Culvert 2 Dimensions (m)			Upstream Channel Dimensions (m)	Downstream Channel Dimensions (m)	Water Depth (m)	Catchment Area (km2)	Existing Culvert Capacity (m3/s)	100 Year Flow (m3/s)	Minimum Pipe Culvert Diameter Required (mm)*	Hydraulic Status of Existing Crossing
					Diameter	Width	Height	Diameter	Width	Height								
E1	Existing crossing between T24 & T25	111529	231793	Pipe	0.6						0.5D x 0.9W	0.6D x 0.9W	0.5	1.25	0.54	1.912	1100	Requires upgrade
E2	Existing crossing near T24	111159	231754	Pipe	0.6						1.2W x 0.1D	1.1W x 0.8D	0.1	0.3	0.54	0.537	900	Requires upgrade
E3	Existing crossing south of borrow pit 1	109820	232319	Pipe	0.6						1.3W x 0.4D	1W x 1.6D	0.2	0.09	0.54	0.184	900	Requires upgrade
E4	Existing crossing west of T12	110726	233638	Pipe	1.2						2.1w x 0.5D	2.1w x 0.5D	0.15	1.2	3.62	1.844	1200	Adequate
E5	Lake outfall south of T13	111713	233341	Pipe	0.6						1.3W x 0.7D	1.3W x 0.7D	0.45	0.15	0.54	0.290	900	Requires upgrade
E6	Lake outfall N of T21	111896	232959	Pipe	0.45						N/A	1W x 0.05D	0.02	0.09	0.262	0.184	900	Requires upgrade
E7	Main Owenboliska crossing	110873	234222	Box	CULVERT UPGRADED AS PART OF THE GALWAY WINDPARK DEVELOPMENT													Adequate
E8	Existing crossing downstream of Lough Glenn	111291	234497	Box	CULVERT UPGRADED AS PART OF THE GALWAY WINDPARK DEVELOPMENT													Adequate
E9	Existing crossing east of main borrow pit	112421	234651	Box	CULVERT UPGRADED AS PART OF THE GALWAY WINDPARK DEVELOPMENT													Adequate
E10	Existing crossing south of temp compound	112585	234282	Pipe	0.6			0.6			1.5W x 0.6D	2.3W x 0.7D	0.2	1.2	1.08	1.844	2 x 900	Requires upgrade
E11	Existing crossing at T22	112520	232739	Bottomless Box		4.3	1.6				2W x 1.2D	2W x 1.2D	0.3	5.2	58.19	6.800		Adequate
E12	Existing crossing SW of T19	113864	232771	Pipe	0.6						1.5W x 1D	1.5W x 1D	0.1	0.15	0.54	0.290	900	Requires upgrade
E13	Existing crossing northeast of substation	114129	235047	Pipe	0.6						1.4W x 0.9D	1.4W x 0.9D	0.05	0.13	0.54	0.255	900	Requires upgrade
E14	Existing crossing west of construction compound	114315	235237	Bottomless Box		0.6	0.6				0.5W x 0.5D	0.5W x 0.5D	0.2	0.11	0.96	0.220		Adequate
E15	Existing crossing at main entrance	114599	235441	Box	CULVERT UPGRADED AS PART OF THE GALWAY WINDPARK DEVELOPMENT													Adequate
E16	Along existing track between T21 and T25	111762	232371	None Present							4W x 1D	4W x 1.5D	0.3	0.9		1.427	900	Requires upgrade
E17	Existing track SW of permanent compound	114348	235194	Pipe	0.6									0.13	0.54	0.255	900	Requires upgrade

\*Minimum recommended culvert diameter based on OPW guidelines is 900mm

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Using Institute of Hydrology Report 124:

$$Q_{bar} = 0.00108 \times (AREA)^{0.89} \times (SAAR)^{1.17} \times (SOIL)^{2.17}$$

where for site:

SAAR 1593 mm From Met Eireann  
 AREA see table km2 From 1:50,000  
 SOIL 0.4 (NERC, 1975) Soil Index weighted mean

**Return Period** **Growth Factor**

Mean Annual 0  
 30-Year 1.55  
 100-Year 1.9

Existing Stream Crossing 100-Year Flood Flows			
Crossing ID	Area km2	Qbar (m3/s)	100 Year Flood (m3/s)
E1	1.25	1.006	1.912
E2	0.3	0.283	0.537
E3	0.09	0.097	0.184
E4	1.2	0.970	1.844
E5	0.15	0.152	0.290
E6	0.09	0.097	0.184
E7	0	0.000	0.000
E8	0	0.000	0.000
E9	0	0.000	0.000
E10	1.2	0.970	1.844
E11	5.2	3.579	6.800
E12	0.15	0.152	0.290
E13	0.13	0.134	0.255
E14	0.11	0.116	0.220
E15	0	0.000	0.000
E16	0.9	0.751	1.427
E17	0.13	0.134	0.255

Proposed Stream Crossing 100-Year Flood Flows			
Crossing ID	Area km2	Qbar (m3/s)	100 Year Flood (m3/s)
P1	0.45	0.405	0.770
P2	0.9	0.751	1.427
P3	23	13.441	25.537
P4	1.4	1.113	2.115