

Location: Clarina, Co. Limerick		Unique ID: 240377 (from PFRA database)	
Initial OPW Designation	APSR <input checked="" type="checkbox"/>	AFRR <input type="checkbox"/>	IRR <input type="checkbox"/>
Co-ordinates	Easting: 150000	Northing: 154000	
River / Catchment / Sub-catchment	Barnakyle River / Maigue Catchment		
Type of Flooding / Flood Risk (identify all that apply)	Fluvial non-tidal <input checked="" type="checkbox"/> Fluvial tidal <input checked="" type="checkbox"/> Coastal <input type="checkbox"/>		

Stage 1: Desktop Review	
1.1 Flood History (include review of Floodmaps.ie)	<p>River Flow Path</p> <p>The Barnakyle River flows to the south of the town centre and N69. It crosses the N69 at Massey Bridge (approx 1km east of the town), and merges with the Maigue River approx 3km from the town.</p> <p>Flood event records</p> <p>Three flood records:</p> <ul style="list-style-type: none"> Record titled Maigue embankments 1992, but map shows location of flooding at Corcamore 0.7km east of the Maigue embankments and 1.8km northwest of Clarina town. <p>Minutes of meeting identifying areas subject to flooding (Croom Area Engineer)</p> <ul style="list-style-type: none"> Clarina Village (reoccurring) - One event in recent years. Water travelled from North West, across Ballybrown Road, then through village and flooded a number of houses. Cause seems to have been exceptional rainfall. Flood ID 914 premises flooded. Frequency one or two times per annum. Massey's Bridge (reoccurring) – Tidal Flooding. High tide flows through bridge side wall and over the embankment downstream of the bridge on right bank. No houses affected. Area flooded is over a length of 700 to 800m at toe of embankment. Flood ID 915.
1.2 Relevant information on flooding issues from OPW and LA staff	<p>PFRA database comments (<i>in italics</i>):</p> <p>OPW comments <i>Houses in floodplain Protected by OPW defences</i></p> <p>LA comments <i>"Village protected by existing embankment originally designed for agricultural land protection</i></p> <ul style="list-style-type: none"> <i>Risk to facilities</i> <i>Risk to WWTP and nursing home "</i> <p>Meeting / discussion summary comments:</p> <p>OPW comments</p> <ul style="list-style-type: none"> Tidal flooding problem from the Barnakyle River (a tributary to the Maigue). Parts of the older part of the village (from around the 1960s?) are possibly lower than the newer parts of the town. Flooding problem at Massey's Bridge at the west end of Clarina, which floods the main road.

	LA comments <ul style="list-style-type: none"> Main problem area considered to be up by Massey's Bridge. 		
1.4 PFRA Data			
1.4.1 PFRA hazard mapping	PFRA mapping available in GIS layer:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	PFRA mapping included on FRR map:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
1.4.2 Summary of Principal Receptors	Type	FRI score (if available)	
	Nursing Home	2500	
	Monuments (LV)	0.1	
	Total:	3202.24	
1.7 Stage 1 Evaluation	Aspect	Clearly APSR	Uncertain
	Flood History (1.1)	X	
	OPW / LA Information (1.2)		X
	PFRA Evaluation (1.4)	X	
	Overall Desktop Evaluation (if any above aspect is uncertain then overall designation is uncertain)		X
1.8 Proposed level of assessment for Stage 2 site visits	Level A Site Visit	X	
	Level B Site Visit		

Stage 2: Site Inspection		Level A Assessment		
Date and Time of Inspection		Date: 11/04/11		
		Time: 16:30		
Names of inspection team (including OPW/LA staff if present)		Iain Blackwell		
		Kelly Kasperczyk		
2.1 Ground-truthing of Hazard Mapping	Fluvial non-tidal <input checked="" type="checkbox"/> Fluvial tidal <input checked="" type="checkbox"/> Coastal <input type="checkbox"/> Not available <input type="checkbox"/>			
	For the most part, the mapping matches site observations, however, the extents shown at the tributary adjacent to the Nursing Home appear to be over-estimated. There are also large “wedges” which are not clearly verifiable. Tributary to the Barnakyle River close to the Nursing Home appears to have been diverted in the past.			
2.2 Spot check ground-truthing of selected receptor vulnerability (also note any key receptors noted during visit that are not identified by PFRA)	Receptor Type	Location description (if not obvious)	Exists?	Overall Vulnerability / Risk (L / M / H)
	Nursing Home		Yes	L adjacent to small tributary of the Barnakyle River and on higher ground than river banks.
2.3 Local knowledge - on-site comments (OPW, LA and any info volunteered by local residents during visit)	No on site comments.			
2.4 Comments on hydraulic constrictions (bridges, etc.) and conveyance routes	Massey's Bridge – possible restriction on fluvial flow, exacerbated at high tide. Bridge opening is approximately 1/3 of the channel cross section. Possible low spot on the right bank at Massey's Bridge – likely that flows would be directed away from surrounding area.			

2.5 SVRS Assessment Matrix

Weightings:

A - x1 - reasonable expectation of flooding

B - x2 - high expectation of flooding
or flooding is tidal (any risk)

C - x5 - risk to life

Approx. Number	1 to 4				5 to 20				>20			
Weighting		A	B	C		A	B	C		A	B	C
Property (domestic)	10				100	X			200			
Property (small retail or business)	20	X			200				400			
Property (large retail or business)	50				500				1000			
Road or Rail Infrastructure	30				300				600			
Critical Infrastructure (local) [hospital, school, police/fire/ambulance station, substation, WTW/WWTW, gov bldg, other (specify)]	50	X			500				1000			
Critical Infrastructure (national importance)	250				1000				2000			
Cultural Heritage Site	20				200				400			
Environmental Designated Site	20				200				400			
Hazardous Substances Site	50				500				1000			
Total SVRS									170			

2.6 Defence Assets

Formal and Informal Flood Defence Assets

(include effective and ineffective assets to inform asset survey and potential mitigation measures)

Open Channel Watercourses

Man-made river channel ☒ Flood relief channel ☐ Canal ☐
Mill leat ☐ Drainage channels / back drains ☒

Bridges and Culvert crossings

Single Arch bridge ☐ Multi-Arch bridge ☒
Single Span bridge ☐ Multi-Span bridge ☐
Box culvert(s) ☐ Pipe culvert(s) ☒ Arch Culvert(s) ☐

Culverted Watercourses (culvert length is greater than just a crossing)

Box culvert(s) ☐ Pipe culvert(s) ☐ Arch Culvert(s) ☐ Irregular Culvert(s) ☐

Walls and Embankments

Embankment(s) ☒ Raised wall(s) ☐ Retaining wall(s) ☐

Control Structures – weirs, gates, dams

Fixed crest weir ☐ Adjustable weir ☐ Dam / Barrage ☐
Sluice gates ☐ Lock gates ☐ Radial gates ☐

Storage

On-line storage (natural) ☒ On-line storage (artificial) ☐ Off-line storage ☐

	Outfalls Flapped outfall(s) into watercourse <input checked="" type="checkbox"/> Unflapped outfall(s) into watercourse <input type="checkbox"/> <i>i.e. from smaller watercourses, drains etc. into river / estuary / sea</i> Tidal flap(s) <input type="checkbox"/> Tidal sluice(s) <input type="checkbox"/> <i>i.e. from main watercourse into estuary / sea</i> Other Pumping Station <input type="checkbox"/> Erosion Protection <input type="checkbox"/> Sand Dunes <input type="checkbox"/> Additional notes (if required): Main flood defence assets along this reach of the Barnakyle River are the tidal embankments and associated back drains on both sides of the river.
2.8 Initial Potential Mitigation Measures	
Non-structural measures	Planning and Development control <input checked="" type="checkbox"/> Sustainable Urban Drainage Systems <input type="checkbox"/> Flood forecasting / warning <input type="checkbox"/> Change in Operating Procedures for water level control: <input type="checkbox"/> Public awareness campaign <input type="checkbox"/> Individual property protection <input type="checkbox"/> Land use management <input type="checkbox"/>
Structural measures	Strategic development management for floodplain development: <input checked="" type="checkbox"/> <i>(integration of measures into strategic development proposals)</i> Storage: On-line <input type="checkbox"/> Off-line <input checked="" type="checkbox"/> Flow diversion: Flood relief channel <input type="checkbox"/> Flood relief culvert <input type="checkbox"/> Increase conveyance: Bridge works <input checked="" type="checkbox"/> Channel works <input type="checkbox"/> Floodplain <input type="checkbox"/> Flood defences: Walls <input type="checkbox"/> Embankments <input checked="" type="checkbox"/> Localised works: Defence raising <input type="checkbox"/> In-fill gaps <input checked="" type="checkbox"/> Trash screen <input type="checkbox"/> Maintenance works: Culvert / channel clearance <input type="checkbox"/> Asset maintenance <input checked="" type="checkbox"/> Relocation of properties: <input type="checkbox"/> Improve existing defences: <input checked="" type="checkbox"/> (describe) Improvements to embankments may be appropriate as current side slopes are quite steep. Possible changes to embankment profile may be appropriate. Other (describe):

Outcomes				
PFRA Designation	APSR <input checked="" type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input type="checkbox"/>		FRI Score: 3202	
Site Ground-truthing of PFRA Assessment (hazard mapping and receptors)	High Confidence (good)	Uncertain	Low Confidence (poor)	Not available
		X		
Site Visit Review Score	170			
Recommended Designation	APSR <input checked="" type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input type="checkbox"/>			

<p>Summary Comments (if required)</p>	<p>The flood risk to the Nursing Home does not appear to be as significant as the FRI score would suggest.</p> <p>The tributary flow is also different to that shown on the mapping – it flows along the boundary of the Nursing Home and residence to its west, under the road, and merges with the Barnakyle River u/s of the bridge south of the GAA Grounds.</p> <p>The flood risk at present would appear to be low, with the embankments in place. The primary reason for designation is that in the event of a failure of the embankments, properties could be at risk of flooding.</p>
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Photo 1: U/s end of Clarina on Barnakyle River, looking u/s



Photo 2: U/s end of Clarina on Barnakyle River, looking d/s



Photo 3: Looking North towards Clarinet left bank embankment in the foreground



Photo 4: Back drains and embankment on right bank looking u/s



Photo 5: Drainage area and marshland on right bank looking d/s



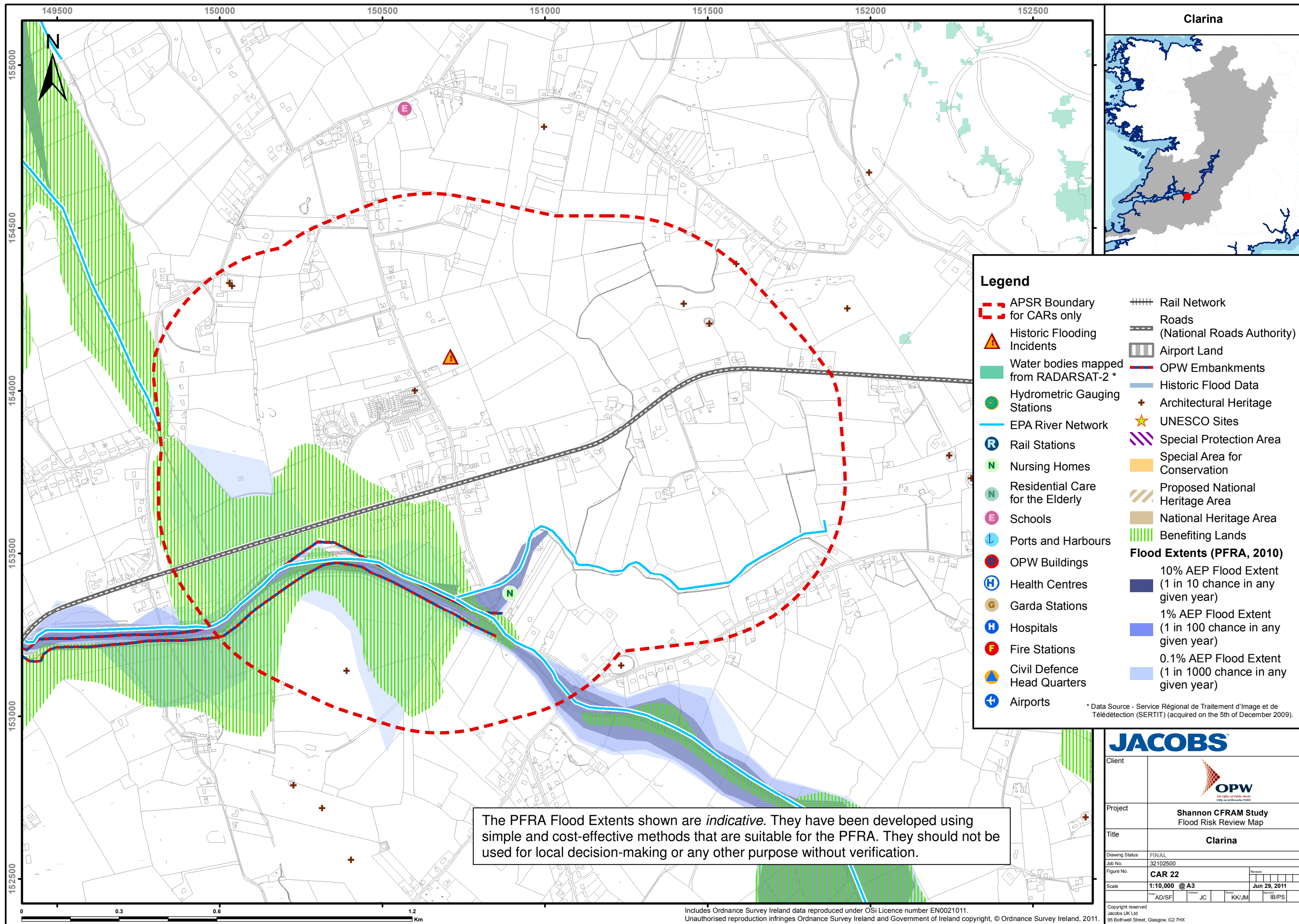
Photo 6: Typical Embankment along the River Barnakyle




Photo 7: Masseys Bridge at d/s end of Clarina



Photo 8: Road to Clarina from embankment next to Massey's Bridge



JACOBS

Client			
Project	Shannon CFRAM Study Flood Risk Review Map		
Title	Clarina		
Drawing Status	FINAL		
Job No.	32102500		
Figure No.	CAR 22		
Scale	1:10,000 @ A3		
Drawn	AD/SF	Checked	JC
Drawn	KK/JM	Checked	IB/PS
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