

<b>Location: Shannon International Airport, Co. Clare</b>		<b>Unique ID: 275484</b> (from PFRA database)	
<b>Initial OPW Designation</b>	<b>APSR</b> <input type="checkbox"/>	<b>AFRR</b> <input type="checkbox"/>	<b>IRR</b> <input checked="" type="checkbox"/>
<b>Co-ordinates</b>	<b>Easting: 137674</b>	<b>Northing: 161045</b>	
<b>River / Catchment / Sub-catchment</b>	<b>Shannon Estuary</b>		
<b>Type of Flooding / Flood Risk</b> (identify all that apply)	<b>Fluvial non-tidal</b> <input checked="" type="checkbox"/> <b>Fluvial tidal</b> <input checked="" type="checkbox"/> <b>Coastal</b> <input checked="" type="checkbox"/>		

<b>Stage 1: Desktop Review</b>	
<p><b>1.1 Flood History (include review of Floodmaps.ie)</b></p>	<p><b>River Flow Path</b></p> <p>At this location the Shannon Estuary is inter-tidal, and therefore can be considered to potentially have both “fluvial tidal” and “coastal” flooding influences. There are also a few minor watercourses that could potentially present a flood risk.</p> <p>Shannon International Airport is located on the northern shore of the River Shannon behind tidal embankments, immediately southwest of Shannon Town. The estuary of the River Fergus is located west of the airport, which also has tidal embankments defending the land behind.</p> <p><b>Flood event records</b></p> <p>There are two flood records listed for north of Shannon Airport from 2000 &amp; 2005.</p> <p>The mapped flood area corresponds to:</p> <ul style="list-style-type: none"> <li>Ballycally - Surface water ran off land onto road L3169 in January 2005. The runoff was from land to south of road. Water flowed around one no. dwelling house but house was not flooded. This is a rare event. Also, c 2000 the L7174 was flooded due to tidal backup from the estuary. A flap valve has been installed into the estuary since and the problem has not recurred.</li> <li>Flooding at Carrigerry near Shannon. No. of Properties damaged was two.</li> </ul>
<p><b>1.2 Relevant information on flooding issues from OPW and LA staff</b></p>	<p><b>PFRA database comments (<i>in italics</i>):</b></p> <p><b>OPW comments</b> <i>IRR airport Incl. as APSR (even though also part of Shannon Town APSR?)</i></p> <p><b>LA comments</b> <i>Critical Infrastructure, Airport building approximately 2 metres below level of Shannon and also has a basement. Large aviation fuel store at site. Site is also a SEVESO site. Clare County Council wish to have the Airport designed as either a signifi</i> <b>Note:</b> Text truncated in PFRA database</p>

	<p><b>Meeting / discussion summary comments:</b></p> <p><b>OPW comments</b></p> <ul style="list-style-type: none"> <li>OPW maintain embankments east of the local road to the airport, and Shannon Airport maintain those west of this point.</li> <li>OPW referred to an area west of the town and airport that may be assessed within this APSR (or airport IRR): sluiced land commission area where houses are protected by embankments</li> </ul> <p><b>LA comments</b></p> <ul style="list-style-type: none"> <li>Major concern with regard to the flooding potential from the Shannon in the event of a breach of the embankments.</li> </ul>		
<b>1.4 PFRA Data</b>			
<b>1.4.1 PFRA hazard mapping</b>	<p><b>PFRA mapping available in GIS layer:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p><b>PFRA mapping included on FRR map:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p><b>Note:</b> Whilst the PFRA mapping is available for the area (for fluvial flooding), there is no coastal mapping.</p>		
<b>1.4.2 Summary of Principal Receptors</b>	<b>Type</b>	<b>Number (approx.)</b>	<b>FRI score (if available)</b>
	<p><b>Note:</b> Shannon International Airport has no score included in the PFRA database under its own entry: “<b>1AIR_Shannon Airport</b>”.</p> <p>However, under Shannon town, there is a score associated with the airport as shown below.</p> <p>Airport_Cr_Weighted_T_C</p> <p><b>Total</b></p>		<p>N/A</p> <p>34250</p> <p><b>34250</b></p>
<b>1.7 Stage 1 Evaluation</b>	<b>Aspect</b>	<b>Clearly IRR</b>	<b>Uncertain</b>
	<b>Flood History (1.1)</b>		<b>x</b>
	<b>OPW / LA Information (1.2)</b>	<b>x</b>	
	<b>PFRA Evaluation (1.4)</b>	<b>x</b>	
	<b>Overall Desktop Evaluation</b> (if any above aspect is uncertain then overall designation is uncertain)	<b>x <sup>(1)</sup></b>	
<b>1.8 Proposed level of assessment for Stage 2 site visits</b>	<b>Level A Site Visit</b>		
	<b>Level B Site Visit</b>		<b>X</b>

**Note: (1)** Although the flood history does not suggest there is a major flooding problem at Shannon Airport, it is considered to be at potentially high risk given its location behind the Shannon embankments. A Level B Site Visit assessment is therefore appropriate for this major infrastructure of national importance.

<b>Stage 2: Site Inspection</b>		<b>Level B Assessment</b>	
<b>Date and Time of Inspection</b>		<b>Date: 09/06/11</b>	
		<b>Time: 16:00</b>	
<b>Names of inspection team (including OPW/LA staff if present)</b>		<b>Iain Blackwell</b>	
		<b>Lewis Maani</b>	
<b>2.3 Local knowledge - on-site comments (OPW, LA and any info volunteered by local residents during visit)</b>		No on-site comments	
<b>2.4 Comments on hydraulic constrictions (bridges, etc.) and conveyance routes</b>		<p>Flood risk at Shannon Airport is primarily from the Shannon Estuary. However, there are a number of smaller watercourses – including drains – that are within the area, for which there are culvert and bridge crossings. It is also noted that the Fergus Estuary to the west may present a flood risk.</p> <p>Given the flat topography of the land behind the embankments (Shannon and Fergus) any breach of the defences would tend to spread across the land behind the embankments, affecting Shannon Airport. There is no clear conveyance route away from the airport.</p>	
<b>2.6 Defence Assets</b>			
<b>Formal and Informal Flood Defence Assets</b> <i>(include effective and ineffective assets to inform asset survey and potential mitigation measures)</i>	<b>Open Channel Watercourses</b>		
	Man-made river channel	<input type="checkbox"/>	Flood relief channel <input type="checkbox"/> Canal <input type="checkbox"/>
	Mill leat	<input type="checkbox"/>	Drainage channels / back drains <input checked="" type="checkbox"/>
	<b>Bridges and Culvert crossings</b>		
	Single Arch bridge	<input type="checkbox"/>	Multi-Arch bridge <input type="checkbox"/>
	Single Span bridge	<input type="checkbox"/>	Multi-Span bridge <input type="checkbox"/>
	Box culvert(s)	<input checked="" type="checkbox"/>	Pipe culvert(s) <input checked="" type="checkbox"/> Arch Culvert(s) <input type="checkbox"/>
	<b>Culverted Watercourses</b> (culvert length is greater than just a crossing)		
	Box culvert(s)	<input type="checkbox"/>	Pipe culvert(s) <input type="checkbox"/> Arch Culvert(s) <input type="checkbox"/> Irregular Culvert(s) <input type="checkbox"/>
	<b>Walls and Embankments</b>		
	Embankment(s)	<input checked="" type="checkbox"/>	Raised wall(s) <input checked="" type="checkbox"/> Retaining wall(s) <input type="checkbox"/>
	<b>Control Structures – weirs, gates, dams</b>		
Fixed crest weir	<input type="checkbox"/>	Adjustable weir <input type="checkbox"/> Dam / Barrage <input type="checkbox"/>	
Sluice gates	<input checked="" type="checkbox"/>	Lock gates <input type="checkbox"/> Radial gates <input type="checkbox"/>	
<b>Storage</b>			
On-line storage (natural)	<input type="checkbox"/>	On-line storage (artificial) <input type="checkbox"/> Off-line storage <input type="checkbox"/>	
<b>Outfalls</b>			
Flapped outfall(s) into watercourse	<input checked="" type="checkbox"/>	Unflapped outfall(s) into watercourse <input checked="" type="checkbox"/>	
<i>i.e. from smaller watercourses, drains etc. into river / estuary / sea</i>			
Tidal flap(s)	<input checked="" type="checkbox"/>	Tidal sluice(s) <input type="checkbox"/>	
<i>i.e. from main watercourse into estuary / sea</i>			

	<p><b>Other</b>  Pumping Station <input checked="" type="checkbox"/> Erosion Protection <input type="checkbox"/> Sand Dunes <input type="checkbox"/></p> <p><b>Additional notes (if required):</b>  Shannon (including the airport) is protected on its south side by extensive flood defence embankments of varying heights. These extend for many kilometres to the east and west, along the Shannon Estuary and the Fergus Estuary protecting large areas of low lying land behind them.  Integral to the flood defence provided by these embankments is the series of drainage channels and back drains behind the embankments, outfalls (with tidal flaps) from these drainage channels through the embankments, and pumping stations to discharge water through the embankments.</p>
<b>2.8 Initial Potential Mitigation Measures</b>	
<b>Non-structural measures</b>	Planning and Development control <input checked="" type="checkbox"/> Sustainable Urban Drainage Systems <input type="checkbox"/> Flood forecasting / warning <input checked="" type="checkbox"/> Change in Operating Procedures for water level control: <input checked="" type="checkbox"/> Public awareness campaign <input type="checkbox"/> Individual property protection <input type="checkbox"/> Land use management <input type="checkbox"/>
<b>Structural measures</b>	<p><b>Strategic development management for floodplain development:</b> <input type="checkbox"/>  <i>(integration of measures into strategic development proposals)</i></p> <p><b>Storage:</b> On-line <input type="checkbox"/> Off-line <input type="checkbox"/></p> <p><b>Flow diversion:</b> Flood relief channel <input type="checkbox"/> Flood relief culvert <input type="checkbox"/></p> <p><b>Increase conveyance:</b> Bridge works <input type="checkbox"/> Channel works <input type="checkbox"/> Floodplain <input type="checkbox"/></p> <p><b>Flood defences:</b> Walls <input checked="" type="checkbox"/> Embankments <input checked="" type="checkbox"/></p> <p><b>Localised works:</b> Defence raising <input checked="" type="checkbox"/> In-fill gaps <input checked="" type="checkbox"/> Trash screen <input type="checkbox"/></p> <p><b>Maintenance works:</b> Culvert / channel clearance <input checked="" type="checkbox"/> Asset maintenance <input checked="" type="checkbox"/></p> <p><b>Relocation of properties:</b> <input type="checkbox"/></p> <p><b>Improve existing defences:</b> <input checked="" type="checkbox"/> <b>(describe)</b></p> <p>The main embankments protecting Shannon International Airport will form an important part of a flood risk management Shannon strategy for the location (including Shannon itself). This is a significant asset already in operation, and therefore provides a basis for improvements where necessary, for example, localised raising (if identified as being necessary).</p> <p><b>Other (describe):</b></p>

<b>Outcomes</b>	
<b>Recommended Designation</b>	APSR <input type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input checked="" type="checkbox"/>
<b>Summary Comments (if required)</b>	Shannon Airport has a major flood risk from tidal flooding in the event of a breach of the Shannon Estuary or Fergus Estuary embankments. It is recommended to be identified as an IRR on the basis of its location behind these embankments and its strategic national importance, rather than because of any previous flood events.



**Photo 1:** Embankment and back drain outfalls close to Shannon Airport.



**Photo 2:** Pumping Station located at the end of a major back drain close to Shannon Airport.



**Photo 3:** Airport car park and other infrastructure located directly behind the Shannon Embankments at a lower level than the estuary inter-tidal zone. Photo taken from top of embankment.



**Photo 4:** Airport car park showing significant difference in elevation between car park and embankment crest (approximately 2.0m).



**Photo 5:** Access road along the top of the embankment bordering the Shannon Estuary inter-tidal-zone. The Shannon Estuary inter-tidal zone is seen beyond the crash barrier.



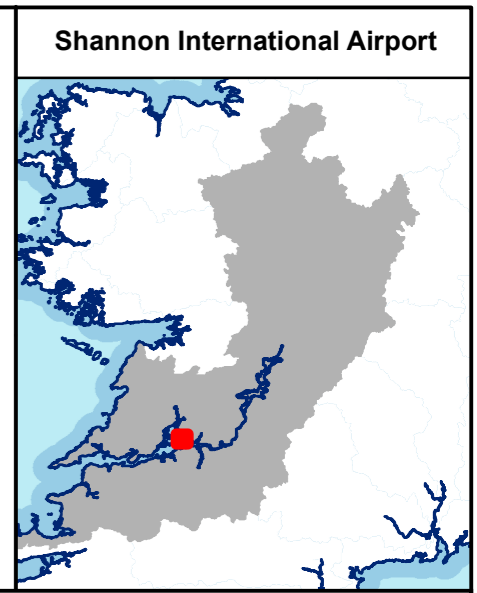
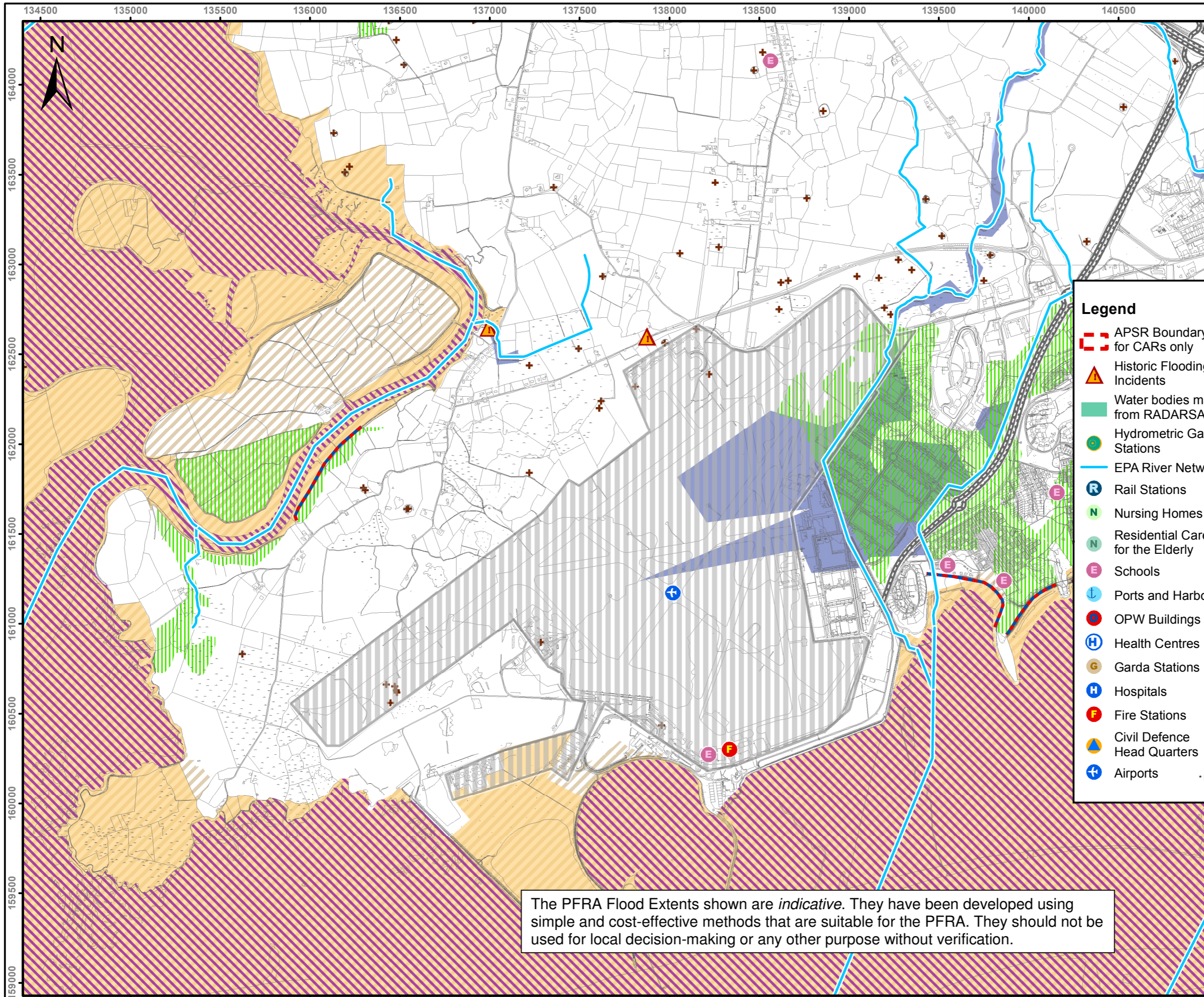
**Photo 6:** Major Shannon tidal embankment adjacent to the airport road towards the eastern end of the airport.



**Photo 7:** View from the top of the embankment (above the pumping station in Photo 2) looking west. Airport infrastructure assets located immediately behind the embankment.



**Photo 8:** Shannon Airport from the air with frontage to the Shannon Estuary.



Shannon International Airport

**Legend**

- APSR Boundary for CARs only
- Historic Flooding Incidents
- Water bodies mapped from RADARSAT-2 \*
- Hydrometric Gauging Stations
- EPA River Network
- Rail Stations
- Nursing Homes
- Residential Care for the Elderly
- Schools
- Ports and Harbours
- OPW Buildings
- Health Centres
- Garda Stations
- Hospitals
- Fire Stations
- Civil Defence Head Quarters
- Airports
- Rail Network
- Roads (National Roads Authority)
- Airport Land
- OPW Embankments
- Historic Flood Data
- Architectural Heritage
- UNESCO Sites
- Special Protection Area
- Special Area for Conservation
- Proposed National Heritage Area
- National Heritage Area
- Benefiting Lands

**Flood Extents (PFRA, 2010)**

- 10% AEP Flood Extent (1 in 10 chance in any given year)
- 1% AEP Flood Extent (1 in 100 chance in any given year)
- 0.1% AEP Flood Extent (1 in 1000 chance in any given year)

\* Data Source - Service Régional de Traitement d'Image et de Télédétection (SERTIT) (acquired on the 5th of December 2009).

The PFRA Flood Extents shown are *indicative*. They have been developed using simple and cost-effective methods that are suitable for the PFRA. They should not be used for local decision-making or any other purpose without verification.

<b>JACOBS</b>	
Client	OPW The Office of Public Works OPW neireachtán na hÉireann
Project	Shannon CFRAM Study Flood Risk Review Map
Title	Shannon International Airport
Drawing Status	FINAL
Job No.	32103000
Figure No.	IRR5
Scale	1:20,000 @ A3
Date	Oct 04, 2011
Drawn	AD/SF
Checked	JC
Reviewed	KK/JM
Approved	IB/PS
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