Section 7 Evaluation of Alternative Plan Scenarios

7.1 Introduction

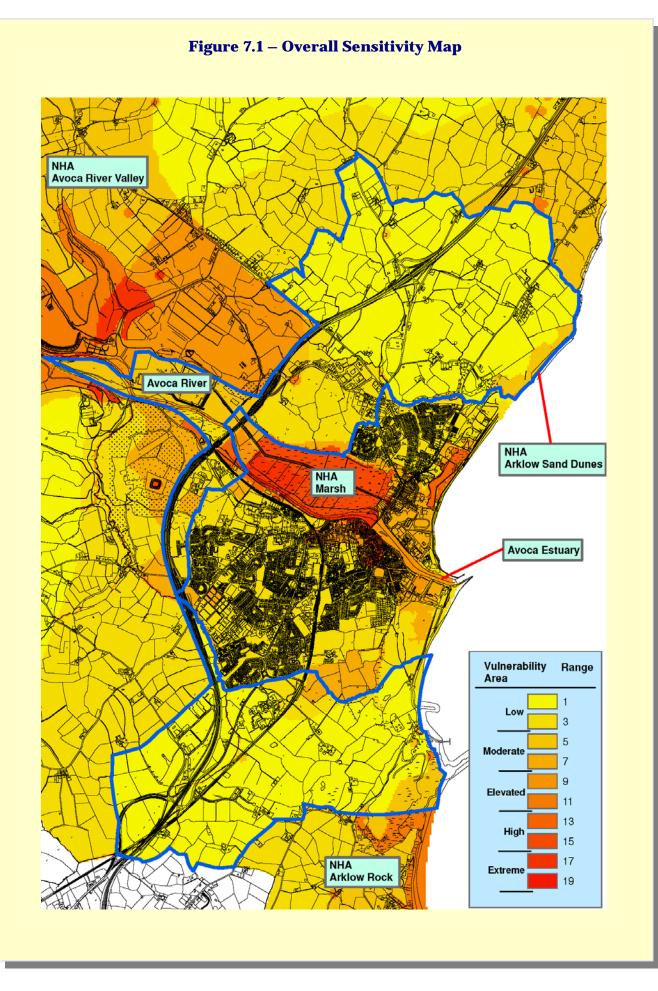
The objective of this section is to determine the relative merits of a range of alternative scenarios under a range of types of plan regimes. This determination seeks to understand whether each alternative is likely to improve, conflict or have a neutral interaction with the provisions of the Plan as well as the certainty of that interaction. A series of Strategic Environmental Objectives were developed based on an understanding of the existing and emerging environmental conditions facing Arklow Town and its Environs. These were then used to assess the likely effect of these different strategic alternatives for the Plan. The SEOs and the Scenarios are then arrayed against each other to identify which interactions – if any – caused impacts on specific components of the environment.

7.2 Methodology

Existing Environment

Use has been made of the description of the environmental baseline, including the maps, which spatially represent components of the environmental baseline (See Section 3) in order to identify how each alternative scenario would impact upon the environment.

The overall sensitivity map used to illustrate the environmental sensitivities of the plan area, places an equal weighting on all environmental sensitivities as set out previously in section 3.12 and as demonstrated in figure 7.1 below. This map was then used to overlay the specific zonings for each alternative plan scenario from which the impacts of each scenario on the existing environment could be evaluated.



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7.3 Strategic Environmental Objectives

Based on an understanding of the existing and emerging environmental conditions in the Arklow Town and Environs area, a series of SEOs were developed in order to assess the likely environmental effects, which would be caused by the implementation of each of the three alternative scenarios described and mapped in Section 6. The alternatives are evaluated using compatibility criteria (see Table 7.2) to determine how they are likely to affect the status of these SEOs.

Table 7.1 brings together all the SEOs, which have been developed from international, national and county policies, which generally govern environmental protection objectives.

The SEOs and the alternative scenarios are arrayed against each other in order to identify which interactions - if any - would cause impacts on specific components of the environment.

Where the appraisal identifies a likely conflict with the status of an SEO, the relevant SEO code is entered into the conflict column - **e.g. B2** To avoid significant adverse impacts, including direct, cumulative and indirect impacts, to relevant habitats, geological features, species or their sustaining resources in designated ecological sites such as Arklow Marsh, Arklow Rock Askintinny and Arklow Sand Dunnes, by development within or adjacent to these

Likely to	Probable	Potential	No Likely
Improve	Conflict	Conflict with	interaction
status of	with status	status of	with status of
SEOs	of SEOs unlikely	SEOs- likely	SEOs
	to be mitigated	to be mitigated	

Criteria for appraising the effect of Plan provisions on Strategic Environmental Objectives

Table 7.1 - Strategic Environmental Codes and Objectives – for the Arklow Town and Environs Development Plan

Code	SEO		
B1	To ensure compliance with the Habitats Directive and National Biodiversity Plan with regard to		
B - iodiversity	protected species and habitats both within and outside of designated sites in accordance with		
	the provisions of Articles 6 and 10 of the Habitats Directive.		
B2	To avoid significant adverse impacts, including direct, cumulative and indirect impacts, to		
	relevant habitats, geological features, species or their sustaining resources in designated		
	ecological sites such as Arklow Marsh, Arklow Rock Askintinny and Arklow Sand Dunnes, by		
	development within or adjacent to these sites		
B3	To ensure compliance with Article 10 of the Habitats Directive with regard to the management of		
	features of the landscape - by sustaining, enhancing or - where relevant - preventing the loss of		
	ecological networks or parts thereof which provide significant connectivity between areas of local		
	biodiversity		
HH1 Human Health	To protect human health from hazards or nuisances arising from exposure to incompatible land		
	uses in particular from the re-use of brown field lands in areas where previous uses may have		
	contaminated lands such as the Water front Development Zone in Arklow.		
R1	Maximise the sustainable re-use of brownfield lands, and maximise the use of the existing built		
Re-use/Regeneration	environment rather than developing greenfield lands		
W-S Water Surface	To maintain and improve, where possible, the quality of Rivers, Lakes and other surface waters		
W-G Water Ground	To prevent pollution and contamination of ground water		
W-F Water Flooding	To prevent development on lands which pose - or are likely to pose in the future - a significant		
	flood risk		
AQ1 Air Quality 1	To reduce travel related greenhouse emissions to air		
AQ2	To reduce car dependency within the plan area by way of, inter alia, encouraging modal change		
Air Quality 2	from car to more sustainable forms of public transport and encouraging development which will		
	not be dependent on private transport		
WW Waste Water	To serve new development with appropriate waste water treatment		
DW Drinking Water	To serve development within the Plan area with drinking water that is both wholesome and clean		
AH1	To protect the archaeological heritage of Arklow including entries to the Record of Monuments		
Archaeological Heritage	and Places - including the towns Zone of Archaeological Potential - and the context of the above		
	within the surrounding landscape where relevant		
AH2	To preserve and protect the special interest and character of Arklow's architectural heritage		
Architectural Heritage	including entries to the Record of Protected Structures, and their context within the surrounding		
	landscape where relevant		
L1	To protect and avoid significant adverse impacts on the landscape of Arklow, including		
	landscape features such as the coastal region, Arklow Sand Dunes and designated views and		
	prospects within the plan area.		

7.4 Evaluation of Alternative Scenarios¹⁴

Scenario 1 Minimal Development Envelope

Environmental Effects

- \Rightarrow Encouraging walking and public transport use over the use of the private car will help to promote sustainable patterns of mobility - with beneficial effects on energy use and emissions to air¹⁵.
- \Rightarrow Encouraging the development of vacant and under-utilised sites in the Town will have beneficial effects of minimising use of undisturbed lands and consequently will contribute to the protection of multiple environmental components¹⁶.
- ⇒ Consolidation of the existing town centre may increase pressures on concentrations of protected structures and the zone of archaeological potential¹⁷.
- ⇒ Zoning of Arklow Marsh pNHA as a conservation Zone and provision of a green buffer will facilitate appropriate management of this area¹⁸
- \Rightarrow A strong recognition of flood management within the Water Front Development Zone objectives and the maintenance of existing open space to the north of the plan will contribute towards preventing increases in flood risk at a number of sites¹⁹.
- ⇒ The provision of a strict objective that no new residential development will be permitted without adequate wastewater treatment infrastructure will significantly benefit existing water resources, human health and flora and fauna in the plan area²⁰.

Critical Planning Evaluation

- \Rightarrow The efficient re-use/regeneration of lands within the Water Front Action Area Development Zone with strong links to the existing town centre uses.
- ⇒ The facilitation of more efficient use of the town centre and within specific identified opportunities.
- \Rightarrow Encouragement of more sustainable modes of transport such as walking and cycling.
- \Rightarrow The promotion of the coastal area for tourism activities
- \Rightarrow The provision of a more compact plan area closely centred around the town centre activities allowing for more sustainable forms transport.

¹⁴ Footnotes like this are used in this section in order to identify instances where interactions between the relevant Scenario and the relevant SEOs occur. The nature of these interactions is identified on Table 7.2.

¹⁵ SEO HH1 AQ1 AQ2

¹⁶ SEO's B1, B2, B3, HH1, R1, W-S, W-G, W-F, AQ1, AQ2, DW, AH1, AH2, L1.

¹⁷ SEO's AH1 & AH2

¹⁸ SEO's B1, B2, B3, W-F, 19 SEO's HH1, W-F,

²⁰ SEO's B1,B2,B3, HH1, W-S, W-G, WW, DW, L1.

Planning Effects

- ⇒ Responds to the relevant national/regional planning strategies including the National Spatial Strategy and the Regional Planning Guidelines for the Greater Dublin Area.
- ⇒ Requires the provision of wastewater treatment infrastructure in order to facilitate development.
- ⇒ Provides for specific guidance on the density and quality of new development within the town centre opportunity sites.
- ⇒ Requires specific local planning and urban design guidance for the development of the Water Front Development Zone Action Area.

Scenario 2 Moderate Development Envelope

Environmental Effects

- ⇒ The additional zoning of lands for employment purposes to the north and south will lead to less sustainable patterns of mobility – with attendant increases in energy consumption and emissions to air. This zoning will also lead to an encroachment on undisturbed pastures and this loss of soils will lead to reduction of both species and habitats ²¹.
- ⇒ Encouraging the development of vacant and under-utilised sites in the Town will have beneficial effects of minimising use of undisturbed lands and consequently will contribute to the protection of multiple environmental component²².
- ⇒ Zoning of Arklow Marsh pNHA as a conservation zone and provision of a green buffer will facilitate appropriate management of this area²³
- ⇒ The inclusion of Action Area 1 at Tinahask for development will lead to a reduction in both species and habitats identified in this area through the Urban Habitat Study²⁴.
- ⇒ A strong recognition of flood management within the Water Front Development Zone objectives and the maintenance of existing open space to the north of the plan will contribute towards preventing increases in flood risk at a number of sites²⁵.

Critical Planning Evaluation

⇒ The efficient re-use/regeneration of lands within the Water Front Action Area Development Zone with strong links to the existing town centre uses will benefit town centre retailing and encourage the use of more sustainable modes of transport such as walking and cycling.

²¹ SEO's HH1, B1, B2, B3, AQ1, AQ2, L1

²² SEO's B1, B2, B3, HH1, R1, W-S, W-G, W-F, AQ1, AQ2, DW, AH1, AH2, L1.

²³ SEO's B1, B2, B3, W-F,

²⁴ SEO's B1, B3

²⁵ SEO's HH1, W-F,

- ⇒ The inclusion of excessive employment zoned lands for single undivided/stand alone employment purposes will lead to an increased land take and increases in traffic in these areas. The inclusion of the northern employment zone at Killinskyduff is likely to impact on the N11 interchange in this area.
- ⇒ Local Objective within new zonings and strong ecological corridors will encourage the sustainable development of these areas benefiting local flora and fauna.
- \Rightarrow The promotion of the coastal area for tourism activities

Planning Effects

- \Rightarrow Provides for a balanced approach between social, environmental and economic factors.
- \Rightarrow Requires the provision of WWT infrastructure in order to facilitate development.
- ⇒ Provides for specific guidance on the density and quality of new development within the town centre opportunity sites.
- ⇒ Requires specific local planning and urban design guidance for the development of the Water Front Development Zone Action Area.
- ⇒ Provides for an increased amount of employment lands exceeding the requirements of the projected population but counteracts this to an extent with specific objectives restricting the type of development allowable within these zones.

Scenario 3 Maximum Development Envelope

Environmental Effects

- ⇒ Zoning of lands resulting in the extension of the urban footprint of the plan area will lead to less sustainable patterns of mobility – with attendant increases in energy consumption and emissions to air²⁶, encroachment on undisturbed pastures and loss of soils will lead to a reduction of both species and habitats²⁷. This greenfield development will reduce the protection of a number of other environmental components²⁸.
- ⇒ The provision of extensive zonings along the coastal area will adversely impact on the coastal landscape²⁹.
- ⇒ Provision of individual on site effluent treatment systems to serve development in the absence of adequate WWT infrastructure will cause a significant negative impact on water resources, habitats and species³⁰.
- ⇒ The designation of Arklow Marsh pNHA as 'Open Space' will reduce the amount of protection on these lands³¹.

²⁶ SEO HH1, AQ1, AQ2

²⁷ SEO B1, B2, B3

²⁸ SEO's B1, B2, B3, R1, W-S, W-G, AQ1, AQ2, WW, DW, L1

²⁹ SEO's B1, B2, B3 L1

³⁰ SEO's B1, B2, B3, HH1, R1, W-S, W-G, WW, DW.

Critical Planning Evaluation

- ⇒ All forms of development are more likely to take place on the edges of the town, where greenfield land is freely available.
- ⇒ Impacts on the N11 interchange to the north of Arklow arising from increased residential and employment development is likely to create traffic congestion entering the town centre across the 19 arch bridge at Ferrybank.
- ⇒ The development pattern is likely to detract from the town centre with increased vacancies on the existing main street and lack of critical mass resulting in a less vibrant town centre.
- ⇒ The quantum of lands proposed for rezoning is not consistent with any housing need Reduction in agricultural land base on the edge of the existing town.

Planning Effects

- ⇒ Fails to respond to the relevant national/regional planning strategies including the National Spatial Strategy and the Regional Planning Guidelines for the Greater Dublin Area.
- ⇒ Leads to an uncoordinated use of lands with disconnected neighbourhoods and isolated areas of employment.
- \Rightarrow Promotes unsustainable modes of transport such as private car.
- ⇒ Would negatively impact on the character of the coastal zone through extensive tourism and residential zonings.
- \Rightarrow Further encroachment to the west of the N11 through zoning at Shelton Abbey.

7.5 Evaluation Against SEO's

Table 7.2 below provides an evaluation of each of the alternative development scenarios for the Draft Plan against the Strategic Environmental Objectives (SEOs).

	Likely to Improve status of SEOs	Probable Conflict with status of SEOs unlikely to be	Potential Conflict with status of SEOs- would be mitigated	No Likely interaction
		mitigated		with status of SEOs
Scenario 1	B1, B2, B3, HH1, R1, WS, WG, WF, DW, AH1,		AH1, AH2 (Consolidation of existing town centre may conflict	
	AH2, L1 (Protection of various environmental		with Archaeological and Architectural Heritage),	
	components resulting from minimising		HH1, (Regeneration of potentially contaminated lands within	
	greenfield development).		the WFD zone)	
	AQ1, AQ2, (reducing travel emissions, energy		B1, B2, B3, R1, WS, WG, WF, WW, DW, L1	
	usage and encouraging sustainable mobility)		(Conflicts with various environmental components and	
	WW, (strictly no development unless adequate		projects will have to be mitigated)	
	WWT in place)			
Scenario 2	B2, (strict protection of pNHA and ecological	AQ1, AQ2, (Expansion of development boundary will lead	B1, R1, W-S, W-G, W-F, DW, L1, AH1, AH2 (Reduced	
	corridors) HH1 (through appropriate	to increases in travel related emissions, energy usage)	protection of various environmental components resulting	
	designation of lands for development) R1	B1, B2, B3, L1 (due to direct impacts as a result of limited	from increasing impingement onto greenfield lands).	
	(promotion of regeneration of town centre	greenfield development to the north and south of the plan		
	sites.	area in Employment Zonings 'A')	HH1, (Regeneration of potentially contaminated lands within	
			the WFD zone)	
Scenario 3		AQ1, AQ2, (Expansion of development boundary will lead	R2, WS, WG, WF, DW, AH1, AH2, (Reduced protection of	
		to increases in travel related emissions, energy usage)	various environmental components resulting from increasing	
		B1, B2, B3, L1 (reduced protection of pNHA and due to	impingement onto greenfield lands).	
		direct impacts as a result of greenfield development)		
		WW, HH1, DW (allowance for individual WWTP to serve	HH1, (Regeneration of potentially contaminated lands within	
		new developments)	the WFD zone)	

7.6 Overlay Mapping

In order to identify the extent to which environmental sensitivities are likely to be impacted upon by the implementation of the Plan alternatives, overlay mapping (which weighs environmental sensitivities and maps them overlapping proposed zonings as shown under Section 3 and 6) was once again used. As mentioned above Figure 7.1 Overlay of Weighted Environmental Sensitivities (all selected factors given equal weight) was used for this purpose.

7.7 Methodology

To carry this out effectively, each land use type was provided with a weighting, which was carried forward through each of the alternative plan scenarios. The weighting system applied to each type of land use was decided upon in consultation with the plan making team. The weighting system was based on the level of potential impact (on a scale of 1-10) each type of land use was perceived to generally have on the receiving environment. Table xx below sets out the weighting system applied to each zoning type.

As can be seen from this table, quarry activities were given a weighing of 10, maximum impact as the processes involved in quarrying where deemed to have the most significant impact on the receiving environment. The Conservation zoning applied at Arklow Marsh in Scenarios 1 and 2 was given the lowest impact rating of 0 to 1 as the this type of zoning was deemed to have a negligible impact if any on the receiving environment given its protective purposes.

Zonings	Weight	Zonings	Weight	Zonings	Weight
Conservation Zone	0-1	Community Zonings all)	4	WFD Mixed Use	8
Agricultural Zone	1	Town Centre	5	Action Area Plans	8
Open Space	2	Low Density Residential	6	New Residential Medium	9
Active Open Space	3	Hotel and Leisure	6	High Density Residential	10
Existing-Residential	4	Employment	7	Quarry Activity	10

Table 7.3 – Weightings applied to Land Use Zoning Objectives:

Once the weightings had been applied to each zoning in the alternative plan scenarios Geographical Information Systems (GIS's) was used to overlay the land use scenario map on top of the overall sensitivity mapping. The mapping system was then used to calculate the potential vulnerability of all land within each of the alternative plan scenarios. For each plan scenario a vunerability range of 2 representing (low vulnerability) to 60+ (high vulnerability) was used. The following provides a visual example of how GIS's was used to calculate and produce the vulnerability maps for each scenario based on the lands highlighted within the Arklow Marsh area.



Example of Overlay Mapping Methodology

Overall sensitivity Map:

Here Arklow Marsh is shown where an overall sensitivity range of 13 has been derived as set out in section 3.12. This indicates that this area is highly sensitive.

Scenario 2 Map:

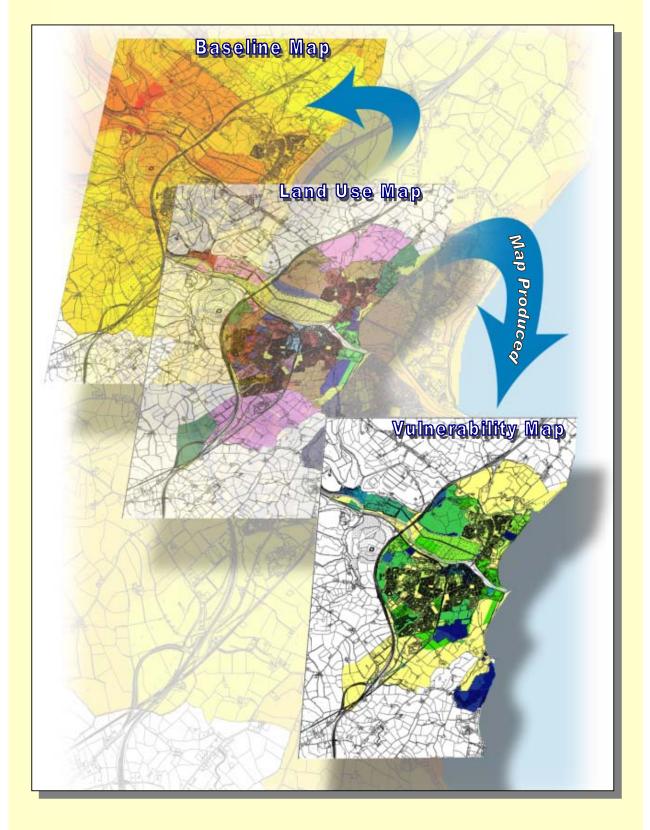
Scenario 2 provides for a zoning objective of a "conservation zone" for Arklow Marsh, which has been given a weighting of 1 (impact of zoning on landscape – least impact as set out in the above table)

Vulnerability Map:

When the weighting from the overall sensitivity map (13) is multiplied by the weighting applied from the zoning objectives (1) (conservation zone – least impact) a vulnerability rating of 13 is derived.

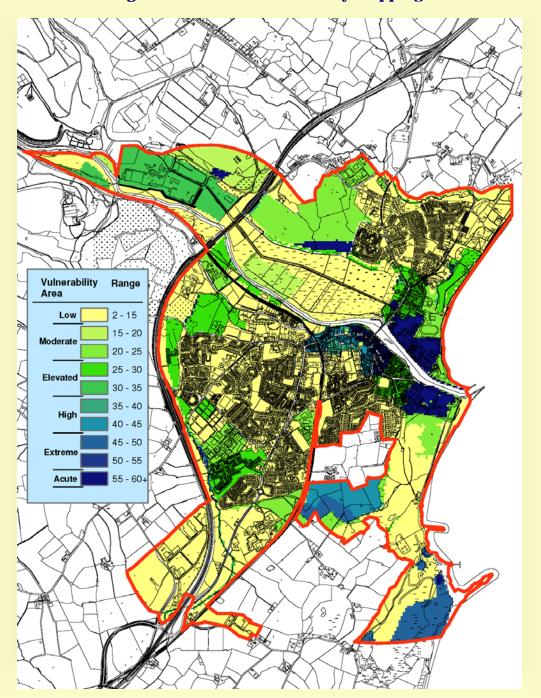
This indicates that the lands use zoning objective of a conservation zone as proposed in scenario 2 will have a negligible if any impact on the existing Arklow Marsh

Figure 7.2 – Graphic of land use map being overlayed on top of the Baseline Map to derive the impact of each plan scenario on the plan area



7.8 Evaluation against overlay mapping

The following figures illustrate and quantify the areas, which are likely to be impacted upon by the provision of each plan scenario. As set out above each scenario was over layed on top of the overall sensitivity map in order to decipher what impacts each plan scenario was likely to have on the receiving environment.





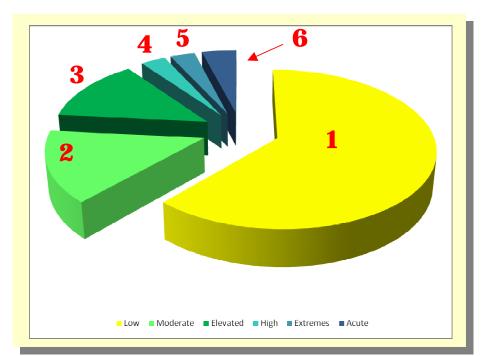
Vulnerability Area	Area (Hectare)	% of Development Pressure Areas covering each Vulnerability Area
1 Low	602.395 Ha	61.8 %
2 Moderate	143.685 Ha	14.74 %
3 Elevated	128.616 Ha	13.19 %
4 High	29.5283 Ha	3.02 %
5 Extremes	29.1835 Ha	2.99 %
6 Acute	40.9497 Ha	4.2 %
Total	974.357 Ha	100%

Table 7.4 – Overlay Mapping quantifications of scenario 1

Environmentally vulnerable areas most likely to be affected by scenario 1

Scenario 1 – (minimal development envelope) covers a smaller land area than scenarios 2 and 3 with 89.69% or 874.69ha falling within the low to elevated vulnerability area. The main areas of high or extreme vulnerability are situated; in and surrounding the town centre area, due to the existing Zone of Archaeological Potential and flooding amongst other factors; to the south of the plan at Tinahask taking into account the Urban Habitats Mapping study findings and the proposed zoning of these lands as an action area and potential use of these lands. The existing quarry activities at Arklow Rock represent a large area of high-extreme vulnerability.

Figure 7.3A – Vulnerability Pie Chart based on land cover area.



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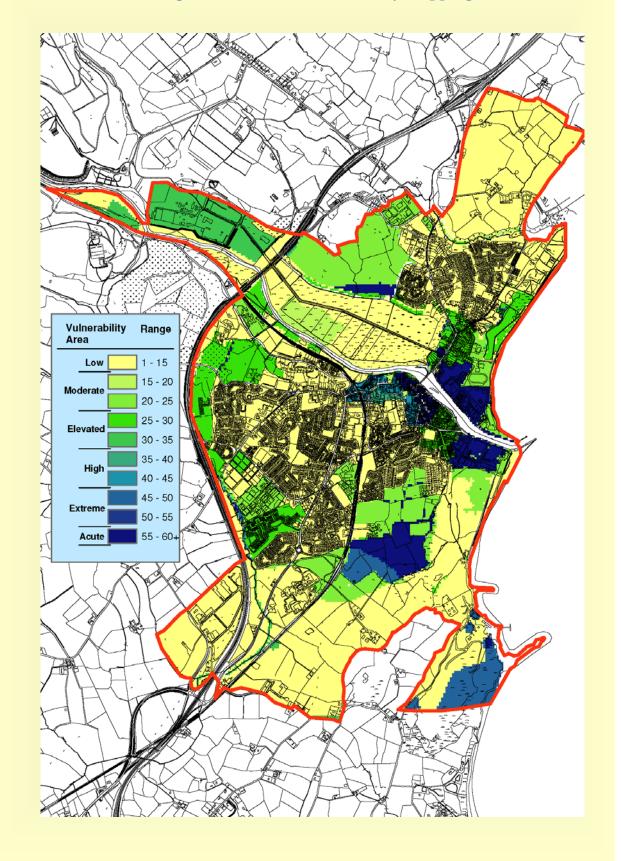


Figure 7.4 – Scenario 2 Overlay Mapping

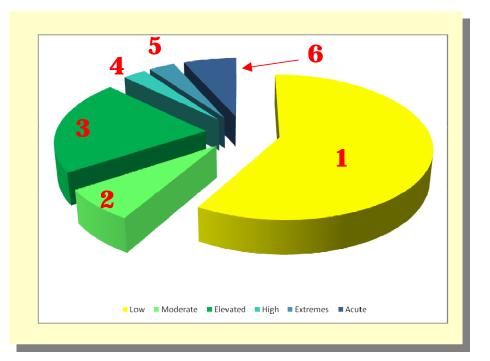
Vulnerability Area	Area (Hectare)	% of Development Pressure Areas covering each Vulnerability Area
1 Low	772.956 Ha	66.24 %
2 Moderate	151.701 Ha	13.00 %
3 Elevated	137.657 Ha	11.79 %
4 High	13.0137 Ha	1.11 %
5 Extremes	31.3854 Ha	2.68 %
6 Acute	60.0967 Ha	5.15 %
Total	1166.81 Ha	100%

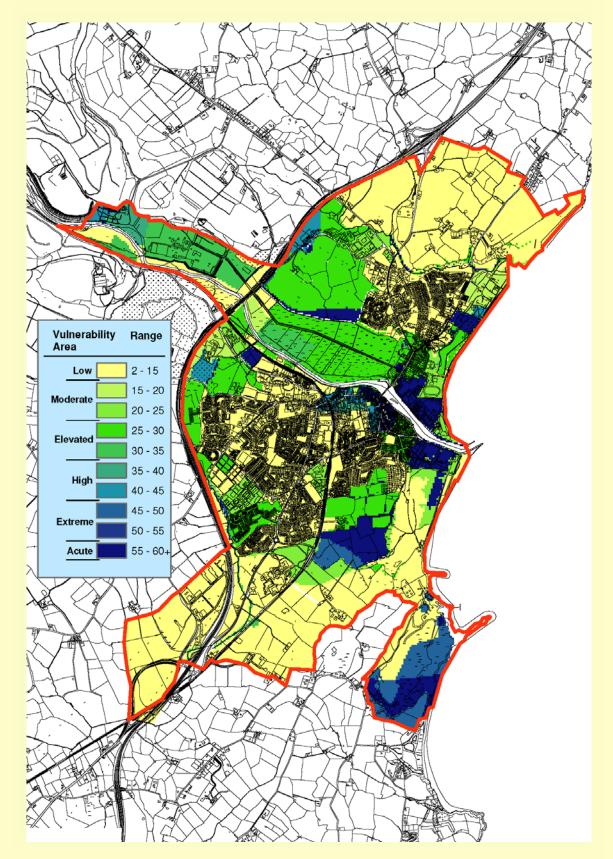
Table 7.5 – Overlay Mapping quantifications of scenario 2

Environmentally vulnerable areas most likely to be affected by scenario 2

Scenario 2 – (Moderate Development Envelope) expands into a greater land area, with 1062.3ha or 91.03% of the subject lands falling within the low to elevated vulnerability area or lower. While this represents a slight percentage increase, the increase in development lands should be noted as this plan scenario represents a slight increase in the amount of lands falling between the high-acute zones. The Scenario represents a slight increase in the Extreme vulnerability zone and a significant increase within the Acute vulnerability range indicating that greater environmental consideration is required in these areas.

Figure 7.6A – Vulnerability Pie Chart based on land cover area.







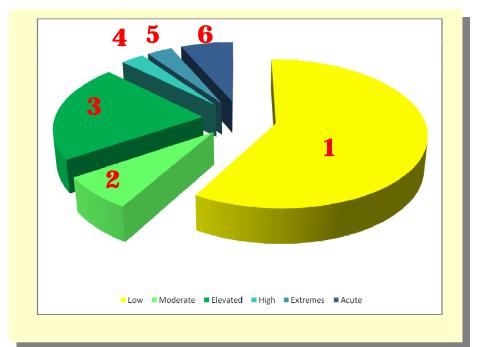
Vulnerability Area	Area (Hectare)	% of Development Pressure Areas covering each Vulnerability Area
1 Low	807.726 Ha	58.37 %
2 Moderate	100.853 Ha	7.28 %
3 Elevated	297.414 Ha	21.49 %
4 High	40.1927 Ha	2.9 %
5 Extremes	45.2518 Ha	3.27 %
6 Acute	92.1382 Ha	6.65 %
Total	1383.58 Ha	100%

Table 7.6 – Overlay Mapping quantifications of scenario 3

Environmentally vulnerable areas most likely to be affected by scenario 3

Scenario 3 – (Maximum Development Envelope) represents a further increased land take, measuring a total of c. 1383.92ha. This scenario also means a greater amount of land falling within the high-acute vulnerability areas, potentially causing significant adverse impacts on the receiving environment. Scenario 3 also represents a 50% increase in the quantity of land falling within the Acute Vulnerability area compared to Scenario 2. The Dark Blue areas on the above map in figure xx highlight these areas of extreme-acute vulnerability emphasising the significant potential impact this plan scenario would have on the receiving environment.

Figure 7.5A – Vulnerability Pie Chart based on land cover area.



7.9 The Measurements indicate the following:

- ⇒ Scenario three would be likely to result in more adverse environmental impacts than each of the other two Scenarios arising from increases; in land take/development of greenfield lands, in air emissions arising from increased car based trips due to the extent of the plan area, loading on infrastructure given the extent of development this scenario provides etc.
- ⇒ If mitigated, Scenarios 1 and 2 would be likely to result in a lesser frequency and magnitude of impacts than Scenario 3.
- Scenario 3 is the scenario with the greatest amount of high and acute vulnerability areas covered by development pressure areas and the only scenario for which extremely vulnerable areas are covered by development pressure areas.

7.10 Comparison of Scenarios 1 and 2:

While Scenarios one and two have very similar attributes, scenario 1 represents a more conservative and consolidated plan format with limited expansion to the existing developed area within the plan boundary. This scenario represents the most environmentally friendly plan format with limited development of greenfield lands, preservation and expansion of green corridors and a strict restriction on development in the absence of adequate infrastructure.

While this may appear to be the ideal plan format to follow, the provisions of this scenario fail to adequately provide for a balanced approach towards the future development of Arklow. Restrictions on the future development of greenfield lands will impose serious implications on the plan being capable of meeting its population requirements as set out in the County Development Plan with the knock on effect of limiting the potential for new community/social infrastructure. Failure to facilitate the projected future population may also have implications for the provision of new or improved infrastructure such as roads and public transport.

Scenario 2 on the other hand, extends the development boundary for the plan area to the north and south quite significantly in order to accommodate standalone large-scale employment developments and also provides for a new action area at Tinahask facilitating the development of residential, community and recreational uses. The designation of such lands aims to ensure that the plan area is capable of meeting the needs of the projected population with the knock on effect of facilitating the potential for the expansion of existing infrastructure.

While both scenarios represent 'green ideology's for Arklow Town and its Environs by facilitating and aiming to enhance existing green corridors, scenario two through the zoning of additional lands to the north and south of the plan area has the potential to conflict with this overarching theme.

In terms of sustainable development however, while scenario 1 represents the least potential environmental impact, scenario 2 provides for a balanced approach in terms of social economic and environmental sustainability for the future development of the plan area while also meeting the higher overarching national/regional planning strategies including the National Spatial Strategy and the Regional Planning Guidelines for the Greater Dublin Area.

7.11 The preferred Alternative:

On the basis of the above analysis Scenario 1 would be likely to improve the status of a number of the SEO's and emerges as the most environmentally friendly option. If unmitigated, Scenarios 2 and 3 would be likely to result in a number of adverse environmental impacts.

Having regard to planning considerations, Scenario 2 provides a better balance between environmental protection and economic and social development while also meeting the higher overarching national/regional planning strategies including the National Spatial Strategy and the Regional Planning Guidelines for the Greater Dublin Area. Under Scenario 2, potential conflicts with environmental objectives can largely be offset by appropriate mitigation measures and therefore this scenario provides for the most sustainable option.

The Draft Development Plan that has emerged from the Plan preparation process most closely corresponds to Scenario 2.