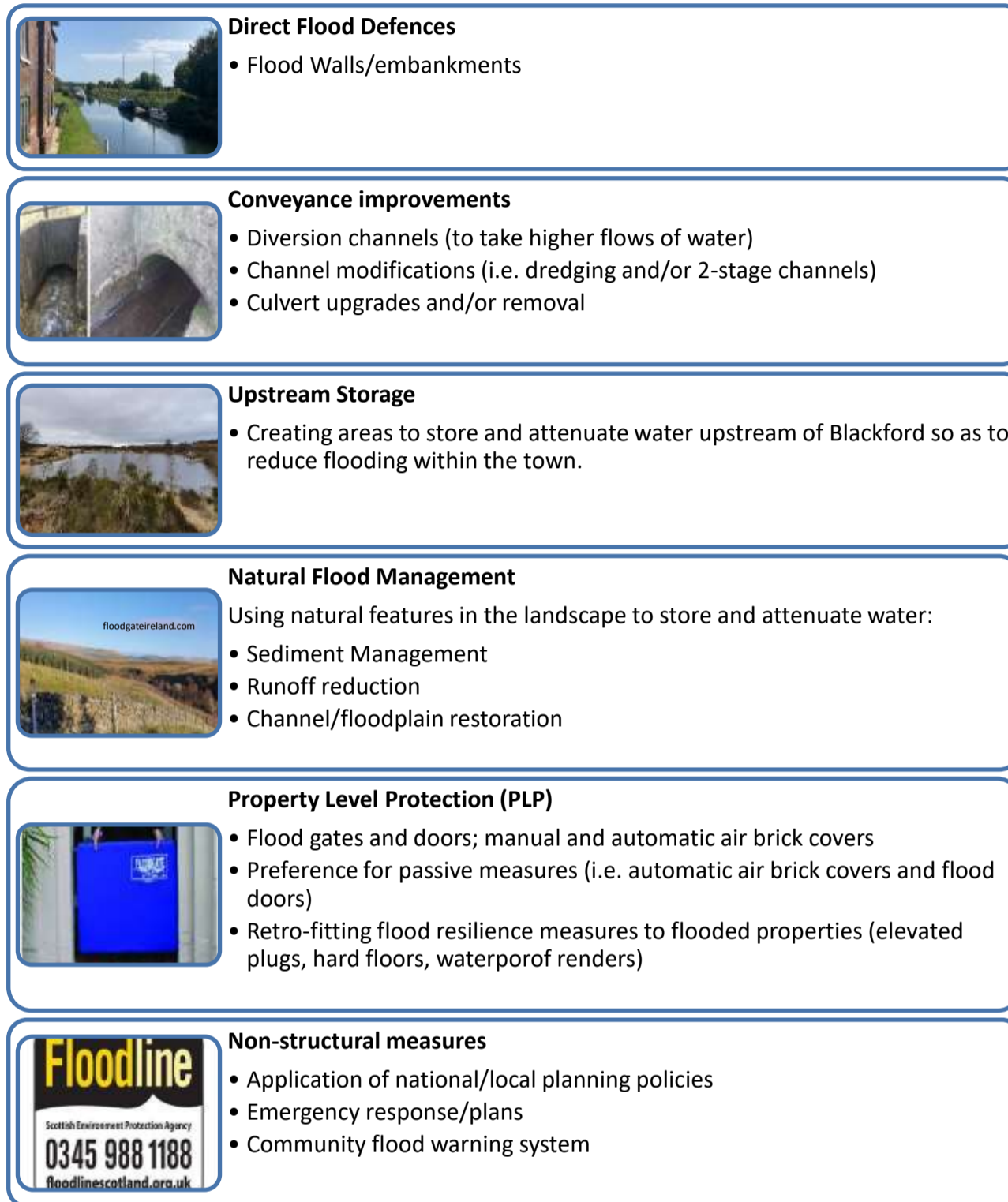


Flood Risk Management Options

The flood study considered various potential ways of managing the flood risk within Blackford. A long list of potential actions was initially reviewed to remove those that were clearly not feasible. Potential actions were appraised on technical, environmental, social and economic grounds. The diagram below summarises the potential actions that were considered:



Feasible actions were considered further and combined to into four potential options:

1. Maintenance/small works;
2. Property level protection (PLP);
3. Direct flood defences and PLP
4. Diversionary channels, direct flood defences and NFM.

Each option has varying levels of benefit. Only two of the options (options 3 and 4) met the study objective of reducing flood risk to all of the identified properties at risk.

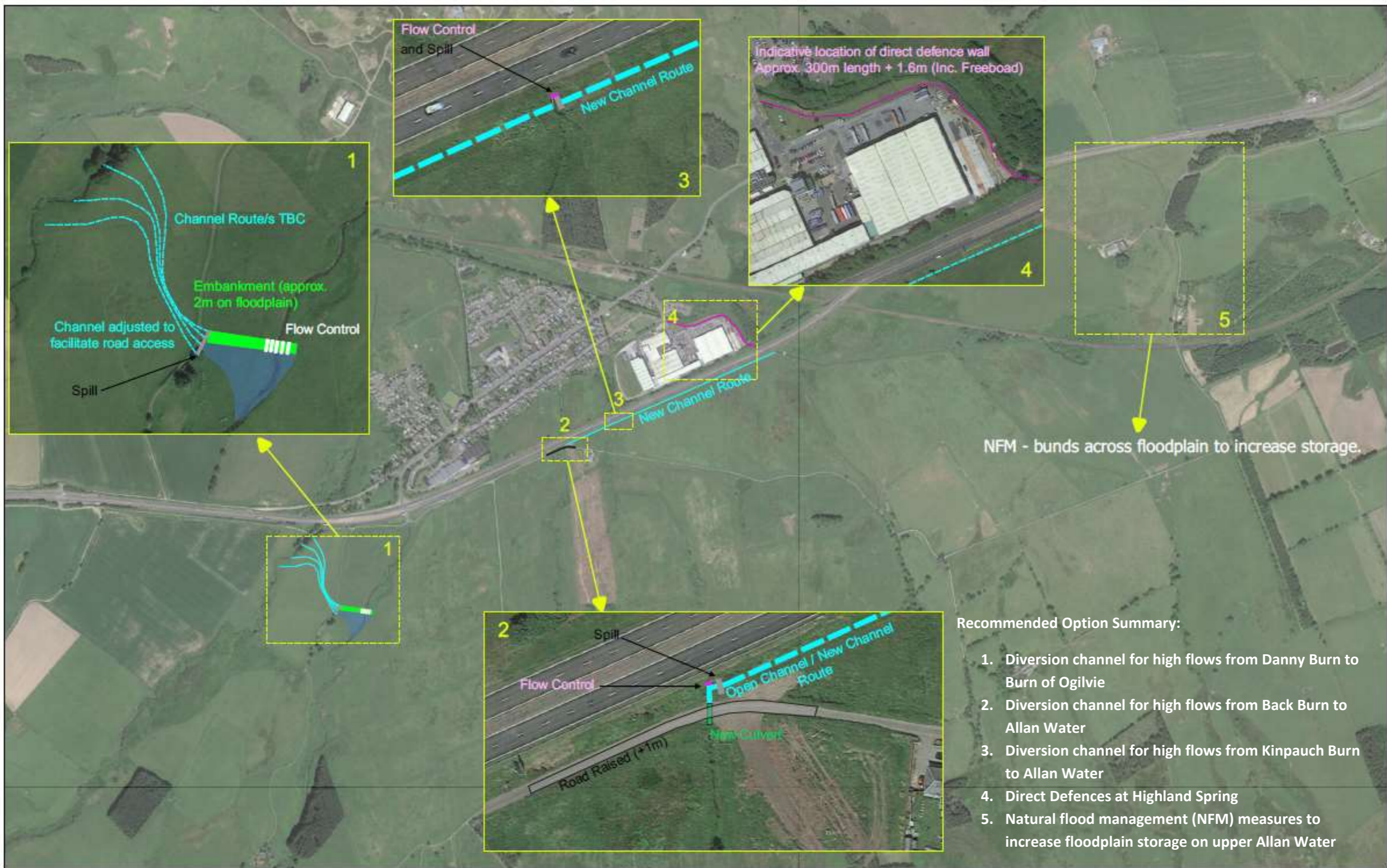
The assessment included an economic appraisal (cost benefit analysis) of the options. In managing flood risk, the Council must have regard to the economic impact of its actions. The cost of a flood scheme can't exceed the benefits, i.e. the benefit/cost ratio must be greater than 1.0. Due to the varying levels of benefits, the benefit/cost ratios only form part of the final overall assessment.

The below table summarises the options assessment:

Table 1: Option Appraisal Summary Table

	Option 1	Option 2	Option 3	Option 4
	Maintenance plus small flood defence ancillary works (The Cross and Abercairney Place)	Property Level Protection (PLP) (residential properties only)	Direct Flood Defences (Tullibardine & Highland Spring) + Property Level Protection (PLP) (residential properties)	Diversion Channel (Danny Burn / Back Burn / Kinpauch Burn) plus Direct Defences (Highland Spring) plus Natural Flood Management
All properties protected (200 year event)?	No	No	Yes	Yes
Initial Capital cost	£841,769	£192,000	£4,635,345	£7,098,740
Benefit:Cost Ratio	1.4	2.9	1.77	1.44
Assessment of option	<p>Option doesn't fully meet study objectives.</p> <p>Only defends The Cross and Abercairney Place. Other properties still at risk.</p> <p>Repeated dredging not recommended on environmental grounds.</p>	<p>Option doesn't fully meet study objectives.</p> <p>PLP not suitable for non-residential properties, which therefore remain at risk.</p> <p>Flood protection relies on measures being installed properly by homeowners (in advance of flooding), and suitable maintenance.</p> <p>Typical life span of around 20-30 years before replacement required.</p> <p>Uptake of PLP measures is historically poor.</p> <p>Only effective up to certain flood depths (typically 0.6m) – modelled 1 in 200 year flood depths are up to 0.4m (for residential properties).</p>	<p>All properties offered a degree of protection but see below.</p> <p>Flood protection provided by PLP relies on measures being installed properly by homeowners (in advance of flooding), and suitable maintenance.</p> <p>Typical life span of PLP around 20-30 years before replacement required also.</p> <p>Uptake of PLP measures is historically poor.</p> <p>PLP only effective up to certain flood depths (typically 0.6m). – modelled 1 in 200 year flood depths are up to 0.4m (for residential properties).</p>	<p>All properties defended – plus benefit to the A9.</p> <p>Diversion works are remote from the village thereby reducing impact (both during construction and longer-term).</p> <p>Visual impact of direct defences also limited.</p> <p>NFM opportunities through reuse of material claimed on site during construction.</p> <p>Potential for multiple benefits (biodiversity/habitat creation/amenity) along diversion routes and NFM.</p>
	Option 1 is not recommended	Option 2 is not recommended	Option 3 is not recommended	Option 4 is recommended

The draft flood study has recommended that Option 4 be taken forward. Further details of this option are shown on the plan on the next page. It is important to note that whilst option 4 has been recommended, it does not preclude other action being considered as part of future design work.



NFM - bunds across floodplain to increase storage.

Recommended Option Summary:

1. Diversion channel for high flows from Danny Burn to Burn of Ogilvie
2. Diversion channel for high flows from Back Burn to Allan Water
3. Diversion channel for high flows from Kinpauch Burn to Allan Water
4. Direct Defences at Highland Spring
5. Natural flood management (NFM) measures to increase floodplain storage on upper Allan Water